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Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

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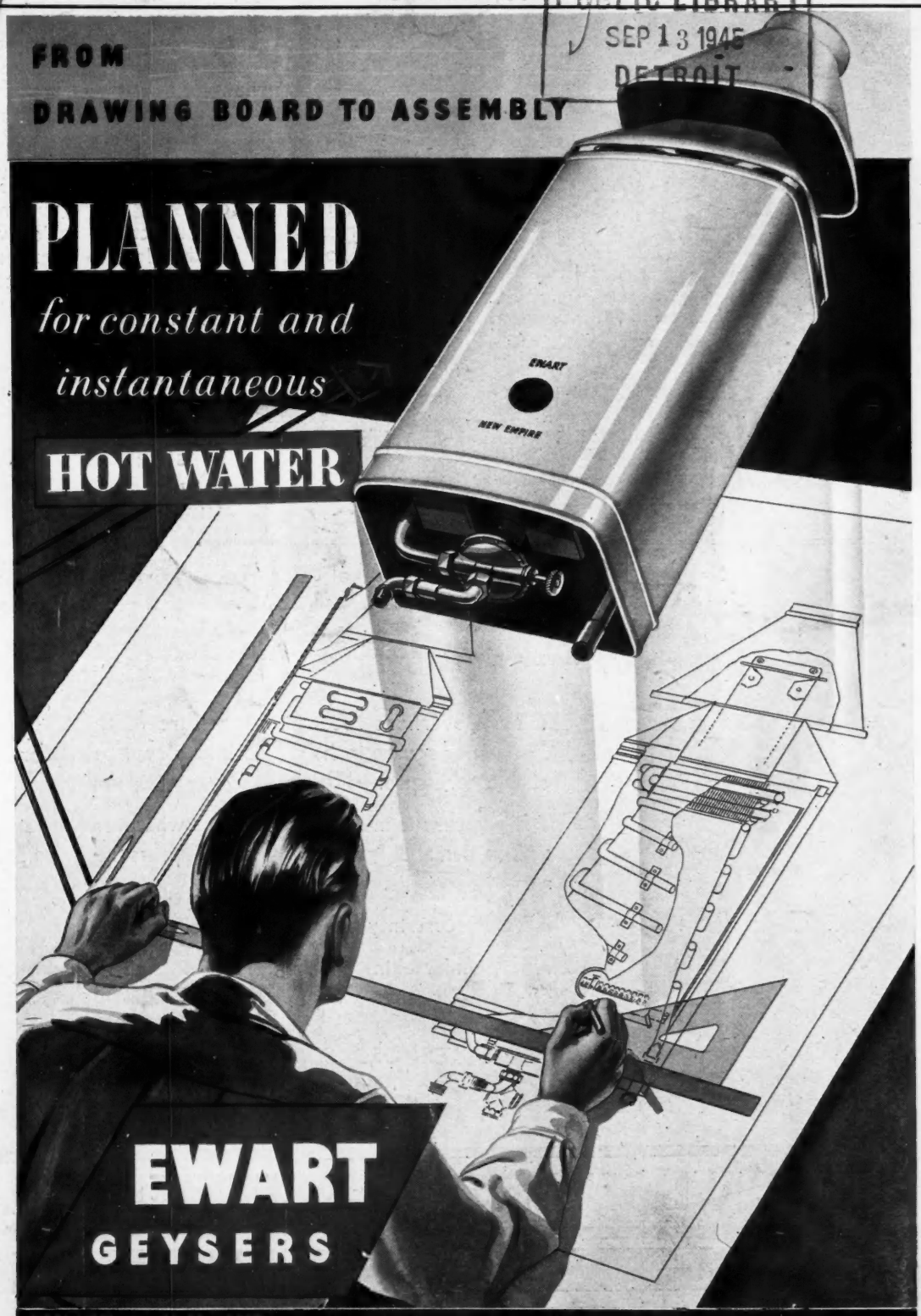

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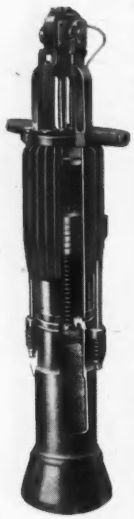

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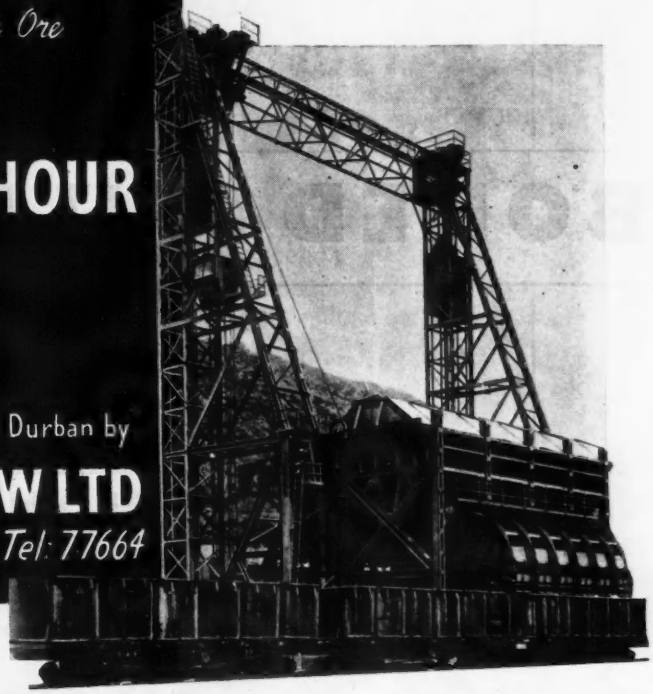
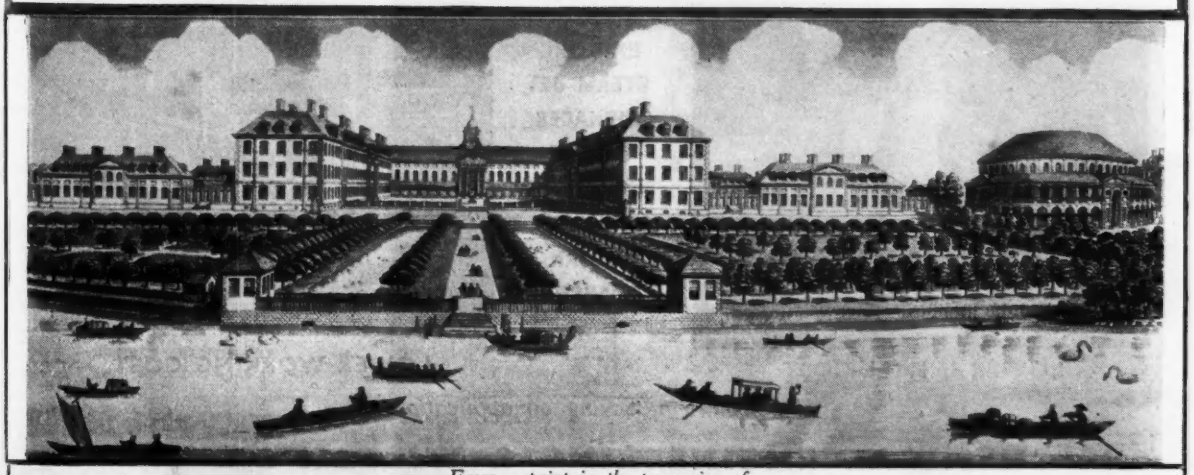


View of the ROYAL HOSPITAL, CHELSEA, with the Rotunda at RANELAGH GARDENS

In the more leisurely days of the 17th and 18th centuries the Thames was a populous highway, and the numerous boats and barges, some with built-in cabins resembling gondolas, must have presented a gay and animated appearance. On one visit by King George I. to Ranelagh House, the royal barges were accompanied by hundreds of illuminated boats, while in one of the City barges Handel conducted his well-known 'Water Music' with an orchestra of 50 performers, greatly to the King's pleasure



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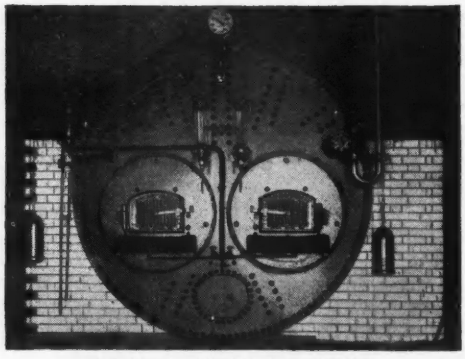

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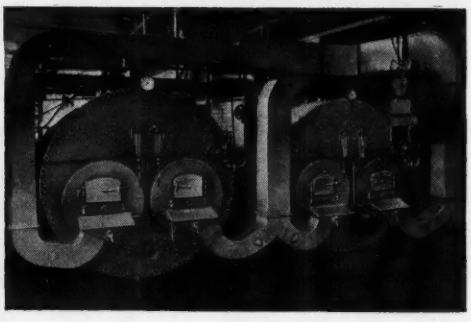

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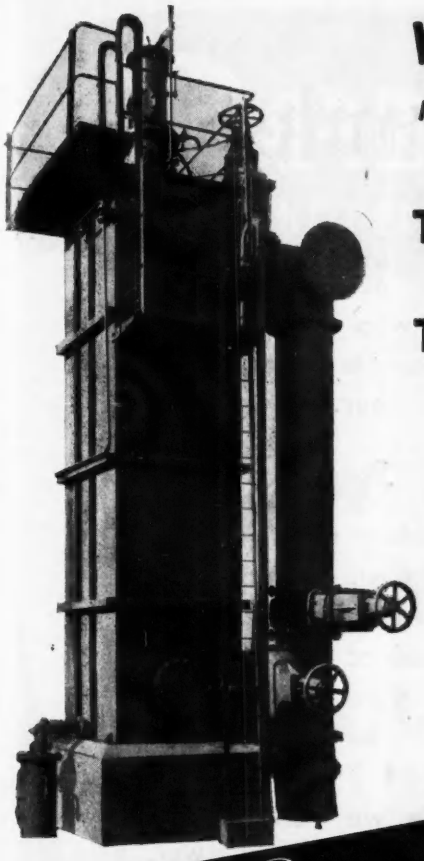

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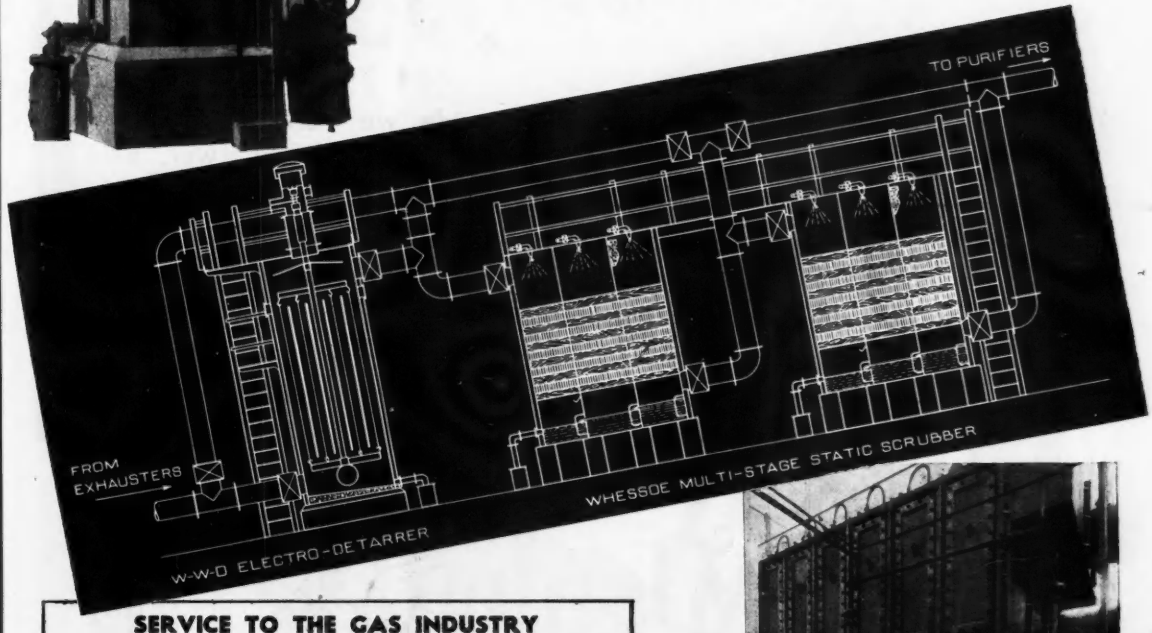

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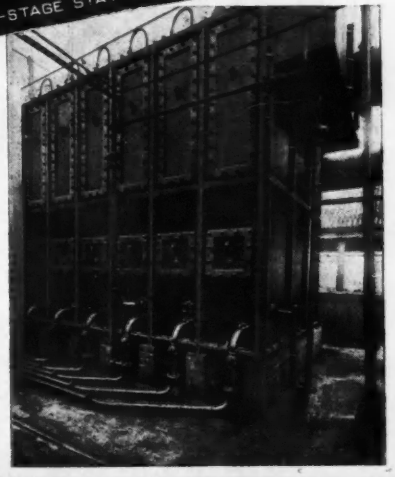

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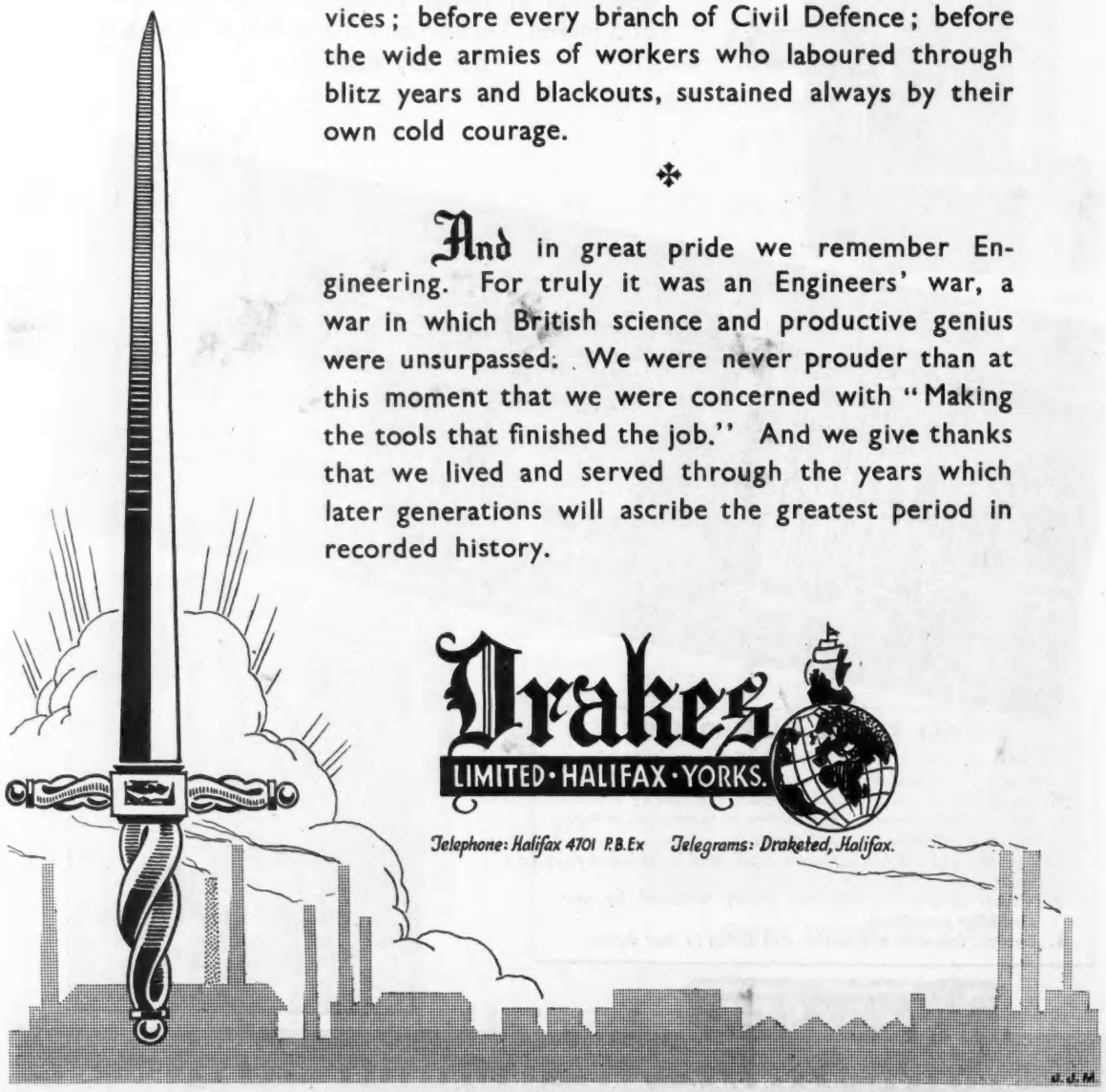

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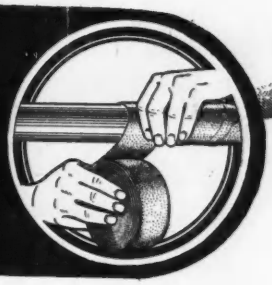

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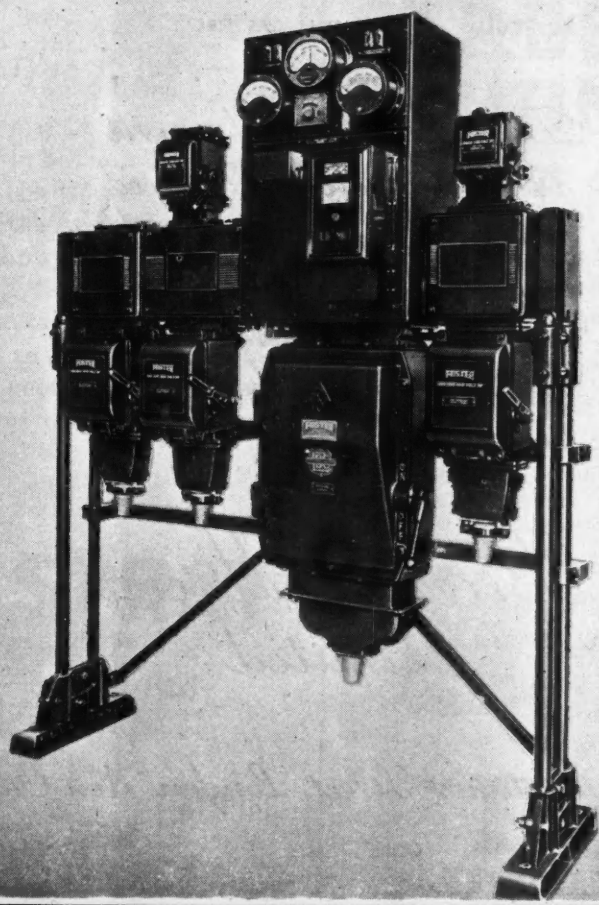

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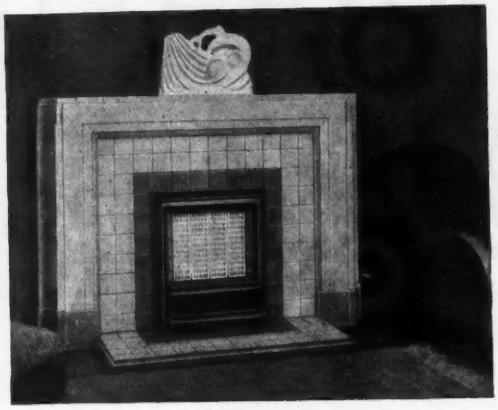

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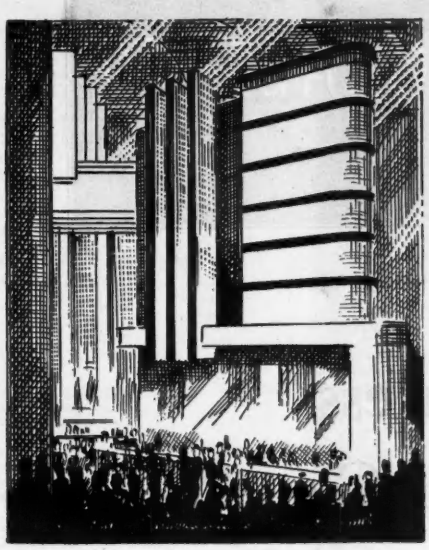

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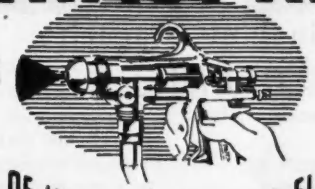

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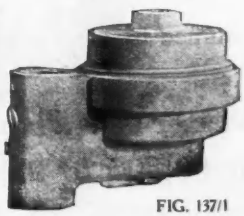

FIG. 137/1

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Oil used per 1,000 cu. ft.	**2·0** gall.
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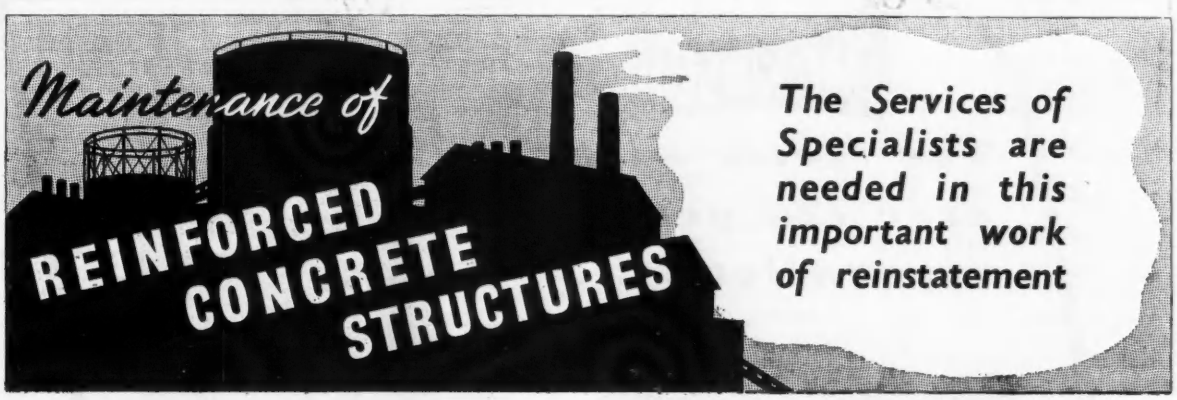
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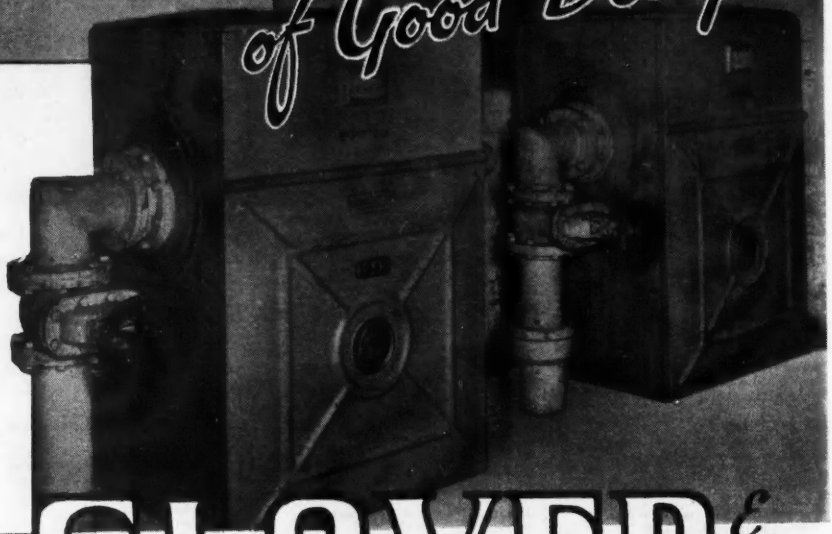

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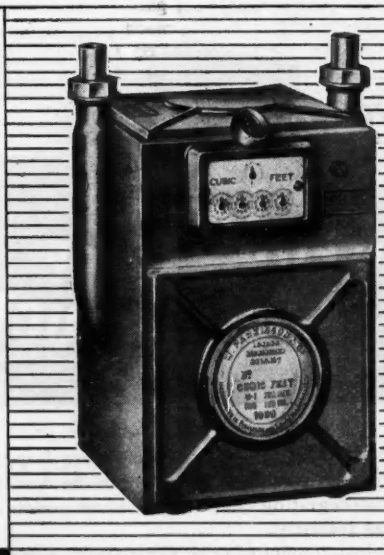

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p. 5

GAS JOURNAL, AUG. 22, 1945

VOL. 246 97th YEAR No. 4292

Final Victory

THE simple sincerity of the King's broadcast on the evening of August 15, following the Prime Minister's declaration on that day that a World War of unprecedented magnitude and extent—the Second World War in the course of less than half a century—had in Allied Victory passed into history, found echo in all our hearts, just as His Majesty's admonition that relief from past dangers must not blind us to the demands of the future steeled our determination to maintain the unflagging spirit which has been the mainspring of our endeavours since September the third of 1939. "The British people," said His Majesty, "have added lustre to the true fame of our Islands"; and we must make sure that the "peace gained amid measureless trials and suffering shall not be cast away." The difficulties of the immediate years ahead are plain to see, and it is equally apparent that their solution lies in labour—spiritual, intellectual, manual. As precursor, we believe there is the transcendental quality of hope.

And what of the Gas Industry? There can be no doubt of its determination to do all in its power to foster national well-being, irrespective of mutations in political power or direction. In the comparatively short time since May 8 some of its efforts amid the war years have been unfolded; more remains to be told. The story, we suggest, is not a mean one. The Industry emerges from the ravages of war robust in will; alive to the difficult and maybe harsh times ahead; above all, inspired by the aim which flows freely through its veins—the clear, constant aim of service to the community.

DISTRIBUTION NEEDS

THERE are plenty of pointers that, whatever form reorganization in the Gas Industry takes, gas distribution in the future will have to be planned on much broader lines and the systems will have to be co-ordinated to embrace more extensive areas and allow for interlinking. Hence the importance of the Paper by Mr. F. Bell, Distributing Engineer to the Liverpool Gas Company, to the Manchester and District Juniors; the Paper, which showed the value of remote indication and control of gas distributing stations—a factor of great importance in any scheme of integration of gas undertakings to give better service to the consumer—was published in our issue of Aug. 1, and a report of the discussion will be found on later pages to-day.

Fortunately there is experience to draw upon in the planning and operation of modern gas distribution systems and the application of comparatively new technique—as examples the work carried out with Swindon as centre and that undertaken by the United Kingdom Gas Corporation spring at once to mind as being outstanding in practice and result. And we hope that the Paper will have stimulated interest in the subject as a whole, perhaps more especially the interest of the younger men whose first leaning is towards manufacture. In which connexion we would draw attention to the comments of Mr. H. B. Taylor in the discussion. Mr. Taylor, whose work on the question is widely known, is, following his experience with U.K., in a position to talk about it with acknowledged authority, and his view that within the next 10 years nearly all gas undertakings will have to reorganize their distribution systems will not be lightly dismissed. In the case of his own undertaking, out of a total issued capital of about £7,000,000, £750,000 has already been expended on distribution improvements in the areas it serves, and a further expenditure of £1,750,000 is contemplated before all the systems can provide the desired service to meet the loads which are confidently expected. Such facts have their implications; and the need stands out for sufficient technicians capable of planning on a scientific basis and of carrying ideas into practical effect.

§§

APPEAL FOR COAL

LABOUR is in power. Following the first official meeting of the new Minister of Fuel and Power, Mr. Shinwell, and the National Union of Mineworkers, an appeal was issued to miners to increase coal output. The coal industry is to be nationalized. Let us hope that either psychologically or catalytically the magic word "nationalization" will spell fuller coal bunkers and fuller coal cellars. The responsibility behind nationalization is grave. That the present rate of coal production is insufficient to meet the essential needs of this country is well enough known. If we are to re-establish our export trade we obviously need increased coal output from the pits. The Executive Committee of the National Union of Mineworkers stated: "We can see in the immediate future the realization of our long-sustained demand for the national ownership of the coal-mining industry; let us now make our best contribution to the short-term problem with all the strength that lies in our organization and membership." The Gas Industry awaits results. Mr. Shinwell has appealed for an extra 8,000,000 tons of coal over the present production rate between October and next March or April. That means approximately an extra 250,000 tons a week.

Meanwhile statistics for the coal industry for the second quarter of this year show another drop in coal output compared with the first quarter of the year and with the second quarter of 1944. An output of 43,687,400 tons for an average of 715,400 wage-earners on colliery books represented a decrease of 1.8 million tons in output of mined coal compared with the previous quarter. Compared with the corresponding quarter in 1944, the output figures show a drop in mined coal of 2.4 million tons and an increase of 1,000,000 tons in tonnage lost. Output of opencast coal in the second quarter of 1945 was also a little lower than in the same period of 1944. The output per wage earner in the quarter averaged 61.1, compared with 63.5 for the first quarter of the year, and 64.9 in the second quarter of 1944. We hope that, now the miners have got what they asked for politically, the extra 8,000,000 tons of coal will in fact be raised during the next six months.

The Housing Programme

On Saturday last the Minister of Health, Mr. Aneurin Bevan, explained his target of 27,000 permanent houses under construction before autumn. This is the total of houses for which the local authorities have been authorized to get tenders. The number of houses for which sites have been developed, with roads and sewers, is about 47,000. In addition, sites for 233,000 permanent houses have been acquired by previous Governments, and roads and sewers prepared for 60,000 houses.

The present Government place more emphasis on permanent than on temporary provision of houses, though it will doubtless be glad to utilize the temporaries for emergency accommodation. The Sandys-Willink programme, it will be recollected, aimed at producing about 100,000 temporary houses built or building by April, 1947. Over a month ago 2,000 houses had actually been erected, a further 10,000 had been delivered and work had begun on 5,000. The permanent houses mentioned by Mr. Bevan will, it is understood, have local designs based on the report of the Dudley Committee. This Committee estimated that three-bedroomed houses could be let economically at 13s. 1d. a week plus rates, a figure about 5s. above the normal pre-war council house rent.

Personal

Mr. W. H. BLUNDSTONE, Gas Engineer and Manager to the Newark Corporation, has been appointed to a similar post with the Malvern Urban District Council. Mr. Blundstone, who holds the degree of B.Sc., and is an Assoc.M.Inst.C.E., and A.M.I.Chem.E., went to Newark from Dewsbury.

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Mr. MARK NEWSOME, jun., Assistant Engineer to the Loughborough Corporation Gas Department, has been appointed Deputy Engineer and Manager to the Corporation of Leigh Gas and Water Departments.

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Major ALAN GIBBS, R.A., who prior to the war was employed by the Torquay and Paignton Gas Company, has been mentioned in despatches for distinguished and gallant conduct. He was in the Territorials when war broke out and was called up, and with the rank of Lieutenant went to France. He was in the Dunkirk evacuation, and afterwards fought in North Africa, going through the campaign there and in Italy. He became a Major at the age of 24.

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After 26 years' service with the Salford Corporation Gas Department, spent in various technical and administrative capacities, Mr. C. JAMES, Chief Industrial Sales Engineer for the last 10 years, has resigned to take over an executive position with Messrs. Whittaker Ellis, Ltd., 71–75, Cardigan Street, Birmingham, 4, Civil Engineers and Contractors to the Gas Industry.

The "GAS JOURNAL" and "GAS SERVICE" will return to London on September 14, from and after which date the Address will once more be the familiar one of long association: No. 11, Bolt Court, Fleet Street, London, E.C. 4. Telephone: Central 2236.

Obituary

George Dixon

The death occurred at Nottingham on Aug. 17 of Mr. GEORGE DIXON, B.Eng., M.Inst.C.E., Engineer and General Manager of the Nottingham Gas Department. Mr. Dixon, who was 57 years of age, was a native of Liverpool, and served his apprenticeship to general engineering with the Mersey Engine Works Co., of Liverpool. In 1905–08 he took an engineering course at Liverpool University and graduated B.Eng. From 1908 until 1910 he was articled to the late Isaac Carr, of the Widnes Gas and Water Department, who practised as a Consulting Engineer, and for the following two years he was technical assistant in the Widnes Gas and Water Department. He was then appointed chief assistant to the late J. H. Crowther, Engineer and Manager of the Wallasey Gas and Water Department, a post he occupied for seven years.

In 1919 he became Engineer and Manager of the Lancaster Gas Department, and during his 12 years there he carried out a complete rebuilding and reorganization scheme. At the end of 1931, at the age of 43, he was appointed Engineer and General Manager of the Nottingham Gas Department in succession to Mr. John Wilkinson, and when the Manchester District Association of Gas Engineers conferred Honorary Membership upon Mr. Wilkinson last October, it was Mr. Dixon's happy duty to convey the greetings of the Gas Department which his predecessor had served so well. From his appointment at Nottingham until his untimely death, Mr. Dixon was responsible for carrying out extensive schemes of development, and the undertaking under his leadership has ranked as one of the most efficient in the Industry. On a number of occasions he gave his profession the benefit of his ripe experience, and as recently as 1943 he presented an Institution Paper on "Standards of Technical Performance."

Mr. Dixon was President of the Manchester Association in 1935, having been President of the Manchester Juniors 13 years earlier. In 1936 he was awarded the Gold Medal of the Institution of Gas Engineers, and a year later he became Junior Vice-President. He was President of the Institution in 1940 and 1941. Owing to the critical war situation the arrangements for the 1940 meeting had to be abandoned, and Mr. Dixon had to be content with circularizing printed copies of his Presidential Address. In 1941 he presided over an extremely successful one-day meeting in London, and presented a further Presidential Address which earned for him the hearty congratulations of a meeting of over 400 members. When he handed over the reins of office to Sir Frederick West he was deservedly thanked for having piloted the Institution through two of the most troublous and nerve-wracking years in its history.

Mr. Dixon held office as Chairman of the East Midlands section of the Institute of Fuel, and was Hon. Secretary of the Midland District Board of the National Gas Council. During the war he became Regional Gas Engineering Adviser to the Ministry of Fuel and Power, regional coal spokesman for the Gas Industry, Chairman of No. 3 Region Gas Engineering Advisory Board, and a member of the Ministry's Regional Fuel Efficiency Committee. For his distinguished services he was awarded the O.B.E. (Civil Division) last January.

He had held office as President of the Nottingham Society of Engineers, and was a member of the Nottingham Rotary Club. A keen golfer, he was a member of the Wollaton Park Club. Mr. Dixon leaves a widow, one son (Capt. T. Dixon, serving in India with the R.I.A.S.C.), and two daughters.

The funeral took place privately. A Requiem Mass will be held at St. Barnabas' Cathedral, Nottingham, on Saturday next at 10.30 a.m.

* * *

The death occurred at his home in Edinburgh on Aug. 11 of Mr. HARRY H. GRACIE, formerly Engineer and Manager of the Edinburgh Gas Department. Mr. Gracie, who was a native of Edinburgh, was over 40 years in the Gas Department, and retired 12 years ago. He was appointed Engineer and Manager in 1921, having previously been assistant manager and superintendent of the distribution and sales department. Under his management the gas undertaking made steady progress, and the plant was extended and modernized until the works at Granton became among the best equipped in the country. He was President of the North British Association of Gas Managers in 1928.

Diary

Aug. 24.—Domestic Development Committee: Gas Industry House, 2.30 p.m.
Sept. 6.—Solid Smokeless Fuels Federation: Executive Committee, Gas Industry House, 11 a.m.
Sept. 6.—Industrial Gas Centres Committee: Gas Industry House, 10 a.m.
Sept. 7.—North British Association of Gas Managers: Annual Meeting, Grosvenor Restaurant, Glasgow, 10.30 a.m.
Sept. 10.—Women's Gas Council, Executive Committee: Gas Industry House, 12.45 p.m., to be followed by visit to Watson House.
Sept. 11.—British Gas Council: Gas Industry House, 2.30 p.m.
Sept. 11.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 10 a.m.
Sept. 11–13.—Association of Public Lighting Engineers: Conference in Glasgow.
Sept. 13.—National Federation of Gas Coke Associations: National Technical Committee, Gas Industry House, 2.30 p.m.
Sept. 13.—Solid Smokeless Fuels Federation: Technical Committee, Gas Industry House, 10.30 a.m.
Sept. 17.—London and Counties Coke Association: Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m., Gas Industry House.
Oct. 17.—Eastern Counties Gas Engineers' and Managers' Association: Autumn Meeting, Grosvenor House, Park Lane, W. 1.
Oct. 17.—Institute of Fuel: Royal Geographical Society. Melchett Lecture by Professor C. H. Lander, C.B.E., 6 p.m.

Manchester District Association

President's Day of the Manchester District Association of Gas Engineers was held at Rochdale. Members were entertained at luncheon in the Town Hall by the Mayor of Rochdale (Councillor Albert Barlow, J.P.) and the Chairman and members of the Rochdale Gas Committee. The President of the Association, Mr. Cecil H. Bamber, officiated as Chairman.

The MAYOR OF ROCHDALE, in proposing the toast of the Gas Industry, extended a hearty welcome to the members of the Association. The war had made formidable demands upon the Industry, but on every hand they heard the highest praise for what had been achieved. Shortage of fuel, raw materials, and the right type of labour had been common to all, while many of them had had to face emergencies created through enemy action. He would like to express his admiration for the way in which the Gas Industry had organized itself into Regional Advisory Boards for the solution of technical difficulties and for rendering mutual aid in connexion with air-raid damage. These Boards had contributed in no small measure to the successful way in which the Industry had equipped itself during the war. They were a forerunner of a system of integration which could be of infinite benefit to the industry in future. At their last Committee meeting a statement had been made by their Gas Engineer about a proposal of the Institution of Gas Engineers to arrange for post-war training of intending entrants into the Industry. The Rochdale Committee unanimously agreed to assist in the practical training of such men at their works under the guidance of their Engineer and Manager, Mr. Bamber. The scheme appeared to be an excellent one. He included in the toast the Manchester District Association of Gas Engineers. A few months ago the Association had elected Mr. Bamber as its President, and this was regarded as a very great honour to Rochdale itself.

Mr. T. R. COOK (Blackpool), Junior Vice-President, responded to the toast in the absence of Colonel C. M. Croft, President of the Institution of Gas Engineers. He remarked that the visit to Rochdale was an outstanding one in the light of their President's position.

Mr. G. E. CURRIER (Bradford, Senior Vice-President) proposed the toast of the Rochdale Corporation Gas Department. The Gas Undertaking, he said, had been municipally-owned for the past 101 years, and had conditions been normal no doubt its centenary would have been celebrated in a fitting manner. The Mayor had wisely steered clear of the question of ownership of undertakings. During 100 years of municipal ownership the undertaking had grown in a manner shown by the fact that from 904 consumers the number had advanced to 31,000, and the consumption of gas had risen from 28 million cu.ft. to 859 million cu.ft. per annum. He was informed that over the period of municipal ownership there had been direct relief of rates given by the Gas Department to the Corporation as a whole to the extent of a quarter of a million pounds, while indirectly the undertaking had contributed free public lighting for a period of approximately 30 years. He expressed the hope that at no time in the future would any profits accruing in the gas undertaking be taken for relief of rates. The practice was an entirely wrong one, and any profits accruing should go back into the concern or to the consumers in reduced prices for gas.

Coming to the war record of the Gas Department, there had been a 20% increase in gas output, though, in common with other undertakings, there had been trouble experienced through poor quality coal, shortage of suitable labour, plants being overloaded, and repairs and maintenance being overdue. In spite of all, Rochdale had got through six years of war, and only during one week had it been necessary to effect a small reduction in pressure to the consumers.

Councillor WALTER RHODES, Chairman of the Rochdale Corporation Gas Department, responded to the toast.

Subsequently the visitors proceeded to the Gas-Works, where they inspected the plant, paying particular attention to several items of special interest. These included a coke breeze briquetting plant in course of erection, and the installation of a new exhausting plant.

The proceedings finished in the Gas-Works Canteen, where afternoon tea was served and a short film was shown by Mr. Bamber, depicting the inauguration of the reconstructed carbonizing plant in 1938, and other events in which many of the members of the Association had taken part. A vote of thanks to the Rochdale Gas Department and its staff for their efforts in arranging such an instructive visit was proposed by Mr. NORMAN HUDSON, Engineer and Managing Director of the Mirfield Gas Company, and immediate Past-President of the Association. This was seconded by Mr. D. BENSON, Deputy Engineer and Manager of the Bolton Corporation Gas Department and President of the Manchester and District Junior Gas Association. The MAYOR responded on behalf of the Rochdale Corporation, and Mr. BAMBER, the Gas Engineer, on behalf of the staff.

Leamington Town Council is to start work without delay on the first 20 three-bedroomed houses on its Shrubland Hall estate, and to set up a separate housing department to deal with the big demand for dwellings. In each permanent dwelling there is to be an independent boiler in the kitchen for space heating, hot-water supply, and warming two bedrooms. Gas cookers and wash boilers are to be supplied, and gas circulators to heat the water when the independent boiler is not in use in the summer months. Gas ignition is to be provided for living-room fires and for the solid fuel stove in the kitchen.

Wartime Coke Trade

In its report for the past year, the Executive Committee of the British Coking Industry Association (formerly known as the British Hard Coke Association), gives British output of hard coke during the past six years as follows: 1939, 14.03 million tons; 1940, 15.35 millions; 1941, 14.55 millions; 1942, 14.90 millions; 1943, 14.45 millions; 1944, 14.08 millions.

In 1939 the coking industry was the largest consumer of coal in the country, using 20.4 million tons as compared with 19.1 millions used in the Gas Industry and 15.9 millions in the electricity industry. In 1940 this coal consumption had increased to 22.3 millions, but since then the serious fall in coal output has led the Ministry of Fuel and Power to divert to other industries coals which would normally have been used for carbonizing, and in 1944 the coal carbonized in coke ovens amounted to 20.1 million tons.

The report of the Committee goes on to state that the supplies of coke to blast furnaces have generally been maintained, foundries have been fully supplied, and the exceptional requirements of the Services, including the American Forces, have been met, to a large extent, by coke. In addition, thousands of tons have been supplied to the chemical industry for the manufacture of fertilizers, aviation spirit, explosives, &c., while increasingly large quantities of the coke have been used by domestic consumers for heating purposes.

Since the outbreak of war, coke has been made to bear an undue proportion of the heavy increases in the cost of coal. The national average increase in the cost of coking coal since 1939 has amounted to approximately 125%. The price of coke has increased by about 145%, whereas the price of coke-oven gas obtained by coke ovens has increased by only 45%, sulphate of ammonia by 60%, benzole by 55%, and tar by 110%.

The Committee has made strong representations that the increased cost of production should not be unfairly charged to the consumer of coke, and on May 1 last, when the price of coal was increased by 3s. 6d. per ton, the increase was borne not only by coke but was shared by increases in the price of tar and benzole.

The Committee is of the opinion that the present levels of prices of coke-oven gas are too low, and that the price of coke could be brought down if more satisfactory prices were obtained for coke-oven gas. Negotiations on these lines are taking place with representatives of the Gas Industry, and representatives have presented evidence on behalf to the Committee, under the Chairmanship of Mr. G. Heyworth, appointed to review the structure and organization of the Gas Industry.

"We have," the report states, "continued to co-operate closely with the Gas Industry. Between us we carbonize more than 40 million tons of coal per annum, and through the Solid Smokeless Fuel Federation we, with the Welsh Anthracite and Dry Steam Coal Producers, propose to develop the use of solid smokeless fuels."

BRITISH COKE RESEARCH ASSOCIATION

"During the past five years we have created the British Coke Research Association, financed partly by the industry and partly from Government funds administered by the D.S.I.R. Panels dealing with various branches of research have been appointed, and are now engaged on some of the most important technical problems which face us. Not only have we the active support of the leading coke-oven construction firms, but also that of the Universities of Durham, Glasgow, and Sheffield, which have willingly provided their close co-operation."

At the annual meeting of the Association Mr. R. Alsop was elected Chairman for the ensuing year, and it was unanimously decided to change the name of the British Hard Coke Association to the British Coking Industry Association.

Fuel-Burning Equipment

The Board of Trade have for some time been engaged in simplifying the licensing control on the supply of individual items of plant and machinery. Wherever practicable, the Board are now issuing bulk licences to the machinery manufacturers, authorizing them to supply controlled machinery and plant up to a value related to the capacity expected to be available for a period ahead. The statutory basis of this scheme is the Machinery, Plant, and Appliances (Consolidation) Order, 1945.

The system of bulk licensing is now to be extended to those items of fuel-saving and fuel-burning equipment which the Ministry of Fuel and Power have been authorized to license during the past 18 months. The Board of Trade propose to issue bulk licences to the manufacturers of most of the controlled goods affected, and, as these are granted, it will no longer be necessary for purchasers to obtain individual licences from the Ministry of Fuel and Power in order to acquire goods from the licensed manufacturers. After Sept. 30, no further licences will be issued by the Ministry of Fuel and Power, but supplies by manufacturers will be subject to licence by the Board of Trade (Industries and Manufactures (Engineering) Department, Millbank, London, S.W.1).

Institute of Fuel

A Meeting of the Institute of Fuel will be held in the hall of the Royal Geographical Society on Oct. 17, at 6 p.m., when the Melchett Lecture will be presented by Professor C. H. Lander, C.B.E., Melchett Medallist for 1945. The lecture will deal with the importance of team work in the acquisition of knowledge as contrasted with individual research. Among the items dealt with will be the necessity to enlist the help of people working in correlated subjects, illustrations of the need of such co-operation drawn from the textile industry, the mining industry, heat transference problems generally, results obtained by such co-operation in gas turbine and jet propulsion, flame throwing, fog dispersal, and other wartime developments, lessons to be deduced from past experience and the possibilities opened by such team work in the future expansion of knowledge.

The President, Dr. E. W. Smith, C.B.E., will take the Chair, and the lecture will be illustrated by lantern-slides. No tickets for admission are required, and members of all technical institutions interested in the subject of the lecture are invited.

A.P.L.E. Conference

A Conference of importance, particularly to all interested in street lighting, will meet in Glasgow from Sept. 11 to 13, on the occasion of the 21st anniversary of the formation of the Association of Public Lighting Engineers. The programme is full, and contains items on matters concerning the future of street lighting.

Chief among the subjects is an Address by Dr. J. W. T. Walsh, who will outline the work of the drafting Sub-Committee, responsible for preparing the B.S.I. Specification on Street Lighting to implement the M.O.T. Final Report of 1937. The document which will be laid before the Conference goes a long way to securing more economical and uniform street lighting. Other speakers include Mr. J. M. Ward, Deputy Lighting Engineer of Glasgow, who will describe in detail "Glasgow's Street Lighting."

Mr. J. S. Smyth will present a technical Paper dealing with "Engineering Principles in Street Lantern Design," which will be followed with keen interest by manufacturers of both gas and electric street lanterns. A further subject, and one that will undoubtedly create discussion, is Mr. Francis F. Middleton's Paper dealing with "The Lighting of Bends, Junctions, and Roundabouts." A practical contribution dealing with the financial side of the subject is that entitled "The Commercial Aspect of Public Lighting" by Mr. E. S. Harris, of the Gas Light & Coke Company.

The President, Mr. E. J. Stewart, in his Presidential Address, will expound some fresh angles on street lighting. A further item of practical interest is the exhibition of street lighting apparatus and equipment which will be staged at the Corporation Lighting Department, 20, Trongate, Glasgow.

From the indications already available the Conference promises to be a success numerically. Well over 400 principal local authorities have intimated that they will be sending delegates.

Planning for the Future

We hear so much in these days about planning for the future that we are apt to forget that there was any forward vision before the war. It is refreshing, therefore, to glance at a book we received only a few days before the end of the war in the Far East, a book entitled *Planning for the Future*, published by Drakes, Ltd., Halifax. It was ready for issue just when the war started, but was withheld from distribution until about a month ago. Produced in the best peacetime style, before paper rationing and other wartime restrictions came into operation, it tells the story of close upon a century's engineering enterprise, describes and illustrates some of the latest of the Company's achievements, and finishes with these words: "Facing the new era, the firm moves forward in hope and in confidence. There is much to be done; and firms like Drakes who have shown foresight in making their plans, in extending their resources and facilities for the specific purpose, will be able to deal very capably with the difficult problems and strenuous tasks that lie ahead."

Of the descriptive matter, one section is devoted to the firm's own engineering works in which, at the time the book was written, the ground space of the production shops alone covered 112,399 sq. ft. The other section deals with some of the many and varied contracts carried out. The examples are comprehensive but by no means complete. They represent some of the jobs of which the firm is justly proud, because in every instance shown, problems peculiar to each project had to be considered separately, treated, and mastered.

A chapter on "How it came about" recalls the pioneer work of Mr. Jonas Drake and the subsequent phenomenal growth of the firm, which traded as Jonas Drake from 1847 to 1877, as Jonas Drake & Son from 1877 to 1902, and as Drakes, Ltd., from 1902 onwards. From its earliest days the firm has had a family tradition, the sort of tradition that jealously guards those old-fashioned virtues of diligence, thoroughness, and good craftsmanship. The Drake tradition remains, and direct descendants of the early pioneer family remain actively associated with the administration of a firm whose name is a household word in the Gas Industry.

Canadian Gas Association

The Annual Convention of the Canadian Gas Association was held on June 19–22 at Manoir Richelieu Hotel, Murray Bay, Quebec. It was one of the most successful meetings of the Association held in recent years. During the proceedings Mr. R. M. Connor, Director, A.G.A. Testing Laboratories, presented a Paper on "Gas Industry Research." After describing the research activities of the Laboratories of the American Gas Association, he said: "It has become increasingly evident that henceforth we must rely on our competitive advantages and depend more for our future growth on the development of new ways of producing and utilizing gas.

"There is no pot of gold at the end of our rainbow. Putting it another way, no single discovery is likely to entirely revolutionize our business. Rather it seems that our future progress will be gradual and, we hope, proceed along a broad front. This means specifically that gas cooking, air conditioning, heating, and all other domestic, commercial and industrial uses must be improved to a greater extent and, if possible, simultaneously.

"Whatever we do we must never stop research. It is the life-blood of industry. Practically every worth-while advancement along the lines I have indicated can be attributed directly or indirectly to such endeavours. Everyone realizes we are living in a highly mechanized age. Any business that fails to recognize this fact and governs its policies accordingly is doomed to eventual extinction. Fortunately there is no fundamental reason why our business should fail; instead there are numerous reasons why it should succeed. Its future, however, is largely in our hands."

Training in Illuminating Engineering

During recent years there have been many developments in sources of light and in methods of light control, and the knowledge, both theoretical and practical, required from an efficient illuminating engineer has greatly increased. The Illuminating Engineering Soicety therefore has in hand the introduction of a scheme of education for illuminating engineers, with which will ultimately be incorporated some system affording a hallmark of professional competence.

The requirements of such a scheme are first a general educational background, secondly a theoretical knowledge of the elements of illuminating, engineering, and lastly a period of experience in the practice of illumination.

The educational background should include a fair knowledge of such subjects as mathematics, physics (heat, light, and sound), English and mechanical drawing, up to the standard of the Joint Section "A" examination of the Institutions of Civil and Electrical Engineers, or its equivalent in other allied fields. The minimum standard of theoretical knowledge in the field of illuminating engineering is that required for passing the Intermediate Grade of the Examination in Illuminating Engineering of the City and Guilds of London Institute.

The I.E.S. Council is initiating facilities for obtaining the necessary technical education. Appropriate classes for the Joint Section "A" examination, which is of wide application, are likely to be available at most universities and technical colleges. The provision of classes in illuminating engineering must, however, depend on sufficient support being forthcoming to justify them. Provided there is sufficient demand, courses could be arranged in London, Birmingham, Edinburgh, Glasgow, Leeds, Manchester, Nottingham, and probably other cities.

A typical course would call for attendance for 2½ hours one night per week for one full session. Students whose standard of general education is not up to that required for the Joint Section "A" examination would be well advised to devote at least one further night per week to classes appropriate to that examination. Those whose knowledge is not yet up to School Certificate (Matriculation) standard should concentrate on improving their general knowledge before commencing specialized classes in illuminating engineering.

It is thought that many organizations employing illuminating engineers will also wish to take advantage of the classes in illuminating engineering, and such organizations are requested to communicate with the I.E.S. Secretary at 32, Victoria Street, London, S.W.1, advising him of the number of likely candidates, the date on which they would be prepared to commence study, and the centre which would be most convenient for them.

Humphreys & Glasgow, Ltd., announce that their wartime offices at Winkfield Manor, Ascot, will be closed on Aug. 31 on their return to their London headquarters, Humglas House, 22, Carlisle Place, S.W.1. From Sept. 3 all communications should be addressed to the London office (Telephone Victoria 3961; telegrams, Humglas, Sowest, London).

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

The Effect of Free Space in the Carbonization of Coal in Horizontal Retorts

By J. G. KING, D. MacDOUGALL, and H. BARDGETT

The work described in this Paper was carried out some time before the war at the Fuel Research Station. Since the ground has not been covered in other publications it is considered that the details of the work should now be published.

In the charging of modern horizontal gas retorts a certain amount of free space is left at each end of the charge and between the surface of the charge and the crown of the retort. The spaces at the ends are necessary in order that the whole of the coal shall be within a zone of high temperature, so that the period of heating shall not have to be prolonged unduly after the centre of the charge is carbonized. The amount of free space left above the charge depends upon the type of charging machine used and its method of operation. Some types can be operated so that the coal is rammed tightly in the retort, while in others the withdrawal of the dragbars may leave a space as much as 4 in. in depth.

The extent to which the retort is filled affects the weight of the charge and the throughput of the bench, but in addition the volume of the free spaces left in the retort affects the time of contact of the gases with the hot surfaces. This in turn affects the thermal yield of the gas and its calorific value. The trend in modern practice is to fill the retort to its maximum capacity, leaving as little space as possible between the coal and the crown of the retort, and bringing the end of the charge as close to the doors as possible. This procedure might have reduced the gaseous thermal yield per retort and per ton of coal, but for the fact that the supply of better refractory materials has allowed the use of higher carbonizing temperatures. The combination has resulted in higher thermal yield and output. It is not unlikely that optimum conditions exist for charging retorts, by the adoption of which the best combination of yields of gas and tar per ton of coal and per retort might be achieved.

Conditions of Experiment

The Fuel Research Station setting of eight horizontal retorts was used for the experiments. The setting could be heated either by hot producer gas from a built-in producer or by any fuel gas from an external source. The retorts were 20 ft. long and of oval (⌂) section, 23 in. by 16 in., and the setting was designed to carbonize 10 tons of coal per day. The charging machine was of Guest-Gibbons pattern.

The conditions of carbonization, other than the variable volume of charge, were kept constant. The throughput of coal was maintained at 10 tons per day, the combustion chamber temperature at 1,350°C., and the internal centre temperature at 1,100°C. at the end of the carbonization period. Under these conditions the internal "end" temperatures 3 ft. 9 in. from the outer edge of the metal mouthpiece were 950 ± 20°C. at the charging end and 1,010 ± 20°C. at the discharging end. During the experiments the fuel used was water gas.

The shape of the coal charge, in the first experiments with a full charge, was that used in earlier Fuel Research Station experiments.(1) Each charge of coal was weighed separately and the method of charging to give a repeatable shape was arrived at by trial. The first portion of the charge was placed in any position beyond the retort centre, the ram withdrawn, changed to the discharge position, and used to push the coal to within 28 in. of the discharge end. This procedure was necessary in order to avoid bringing the drag-bars back over the surface of the coal. On the introduction of the second portion of the charge, both portions were pushed together to move the front of the charge to the required distance of 20 in. from the end. The two remaining portions were then charged in the usual manner, the force applied being sufficient to consolidate the mass to a uniform thickness. The loosening effect of the drag-bars on the last portion was finally counteracted by "backing up" with the ram in the discharge position.

Starting from this standard charge alterations were made in steps, by decreasing firstly the length of the charge and secondly its depth, keeping the slope at the ends so far as possible the same as in the standard charge.

The volume of each retort, when free from scurf, was 40.8 cu.ft. or 47.0 cu.ft., including the metal mouthpieces. The bulk density of the coal was 46.4 lb. per cu.ft.; the free space in the retorts when a standard charge had been placed was 11.9 cu.ft. at the ends and none above the charge.

The first experiment was conducted under these conditions, the second and third by shortening the charge in steps of 1 ft. each, and the fourth and fifth by leaving 2 in. and 4 in. spaces respectively above the charge. It was not possible to achieve the latter by actual measurement, and the desired increase of free space was obtained by charging the calculated weight of coal. The actual space was created by loosening the drag-bars of the charging machine and causing them to smooth off the surface. Measurements taken of the position of the charge in the retort showed variations between charges of not more than two inches.

For purposes of exact comparison of gas yields an effort was made to keep the average nitrogen content of the gas constant at 4.5% in each experiment. In horizontal retort practice the nitrogen content of the coal gas may be a variable factor of some importance. A high nitrogen content, for example, indicates inward leakage of flue gas, and as this flue gas contains carbon dioxide and oxygen it can affect all the gas data, including calorific value, volume, and thermal yield. It has been estimated that each additional 1% of nitrogen introduced as flue gas is equivalent to an increase in thermal yield of 0.2 therm per ton of coal. On the other hand, the fixing of conditions to give a low nitrogen content may result in serious outward leakage and loss of gas to the combustion chamber or flues.

One variable whose effect could not be eliminated was the presence of scurf on the retort walls. This differed in experiments 1 to 5 in that 20, 28, 11, 9 and 14 days had elapsed since scurfing. The effect may, however, be discounted, as Fuel Research Station experiments have shown that scurf has only a slight effect upon yield, the observation being made at normal throughput for 50 days after scurfing.

Under the standardized conditions described the steps in exploring the variable of free space can be summarized as shown in Table I.

TABLE I.—Increases of Cracking Space.

Expt. No.	Volume of charge.		Volume of coal.	Volume of interstitial space.	Volume of cracking space.		
					At ends.	Above charge.	Increase total %
	Cwt.	Cu.ft.	Cu.ft.	Cuft.	Cu.ft.	Cu.ft.	
1	12.0	28.9	17.3	11.6	11.9	*Nil*	—
2	11.0	26.5	15.9	10.6	14.3	*Nil*	20
3	10.0	24.1	14.4	9.7	16.7	*Nil*	40
4	11.0	26.5	15.9	10.6	11.9	2.4	20
5	10.0	24.1	14.4	9.7	11.9	4.8	40

Coal Used.

The coal used was ½ in. washed nuts from the Parkgate seam, South Yorkshire (Mitchell Main Colliery Company, Ltd.). The coal was of a very uniform quality. Its mean proximate analysis was: moisture 1.2, volatile matter 32.5, and ash 6.0%, and its ultimate analysis (dry, ash-free coal) was: carbon 85.4, hydrogen 5.3, nitrogen 1.8, sulphur 2.0, and oxygen 5.5%. The coal is recognized as a gas-making coal of high quality and of fairly high caking power (Gray-King index G.6). Its average size was: over ½ in., 82; ½ to ¼ in. 10; ¼ to ⅛ in. 4; less than ⅛ in. 4%. The bulk density was 46.4 lb. per cu.ft., and the volume of the interspaces 0.4 cu.ft. per cu.ft. of charge.

Effect of Interstitial Space

In any coal charge the free space within the coal itself can be quite large in relation to the free space surrounding it. In the coal under examination the interstitial space was 11.6 cu.ft. in a full charge of 28.9 cu.ft. (12 cwt.), a volume only slightly less than the 11.9 cu.ft. of free space. Evidence of the effect of the former is available in earlier Fuel Research Station work(1), where yields from similar Parkgate coal, in which the internal space was varied from 7.6 to 12.1 cu.ft. by using different sizes of coal, were examined. This evidence is summarized in Table II.

TABLE II.—Effect of Increase of Interstitial Space within the Charge.

Size of coal		Below ⅛ in.	Below ½ in.	1½ in. to ⅛ in.
Charge per retort	cwt.	12.5	12.5	11.5
Volume of coal (net)	cu.ft.	19.8	19.3	15.5
Volume of interspaces	"	7.6	8.1	12.1
Volume of end spaces	"	13.4	13.4	13.2
Gas—				
Yield per ton (dry-ash-free coal)	"	13,435	13,280	13,640
Ditto	therms	79.5	80.5	78.8
Calorific value B.Th.U. per	cu.ft.	592	606	578
Specific gravity (air = 1)		0.372	0.370	0.369
Tar—				
Yield per ton (dry ash-free coal), gall.		11.7	10.9	13.0
Specific gravity at 15°C.		1.123	1.131	1.113

The variations were slight and not all of the same order, and it must be assumed that the small variations recorded in these experiments were due as much to the variations in the actual size of coal used as to the variations in the volume of the interstitial space. It would appear, therefore, that the temperature within the coal mass is not sufficiently high, or the time contact sufficiently long, for the internal spaces to act as small cracking chambers.

Effect of Free Space External to the Coal Charge

The effects upon the yields of products of variation of the free space are summarized in Table III.

TABLE III.—YIELDS OF PRODUCTS.

Experiment	1	2	3	4	5
Free space, cu.ft.					
At ends	11.9	14.3	16.7	11.9	11.9
Above charge	—	—	—	2.4	4.8
Yields per ton of coal as charged—					
Coke, cwt.	14.4	14.4	14.4	14.3	14.3
Gas (at 60°F. and 30 in. satd.) cu.ft.	12,540	12,550	12,180	12,470	12,620
Tar (dry) gall.	9.9	10.3	9.5	9.9	9.8
Liquor, total "	15.3	15.6	16.6	21.4	20.3
Liquor excluding water to scrubber "	10.7	10.9	11.9	13.6	13.4
Liquor, per ton of dry coal "	5.6	5.4	5.7	7.8	5.6
Ammonium sulphate equivalent of ammonia in liquor, lb.	17.4	17.8	19.4	23.7	23.8
Ammonium sulphate equivalent of ammonia in gas, lb.	8.2	7.5	3.1	0.9	0.8

The variation in yields found in the experiments, as already stated, can be attributed almost entirely to the increase of cracking space external to the charge. In the absence of any deleterious effect upon the quality of the coke, the most important consideration is the cracking effect of free space upon the gas and tar, as regards both yield and composition.

Gas.

The effect of cracking space on the yield and calorific value of the gas is summarized in Table IV. To compensate for slight irregularities in the nitrogen content of the gas, a closer comparison has been made by reducing the yields of gas in therms to a basis of 1% nitrogen.

TABLE IV.—EFFECT OF CRACKING SPACE ON GAS YIELD.

	Cracking space.		Gas per ton of dry ash-free coal.			
Experiment.	At ends, cu.ft.	Above charge, cu.ft.	Yield, cu.ft.	Yield, therms.	Yield, therms (calculated to 1% nitrogen).	Calorific value, B.Th.U. per cu.ft.
1	11.9	*Nil*	13,540	78.4	78.0	579
2	14.3	*Nil*	13,830	80.2	79.2	580
3	16.7	*Nil*	13,310	80.4	79.5	604
4	11.9	2.4	13,670	79.8	79.7	584
5	11.9	4.8	13,880	81.6	81.5	588

The shortening of the charge so as to increase the cracking space at the ends of the retorts is seen to cause a slight increase, up to 1.5 therms, in the yield of gas. The nature of this increase is not clearly apparent from the analysis (see Table V), owing to variation of the nitrogen content. If this variation in each test is removed by calculation to a composition of 1% of nitrogen, the changes are revealed as being almost entirely due to the increased production of gaseous hydrocarbons. It may be presumed that these are formed by the cracking of the heavier hydrocarbons of the tar vapours.

TABLE V.—ANALYSES OF GASES.

Experiment	1	2	3	4	5
CO_2	1.0	1.3	1.0	1.1	1.0
C_nH_m	2.8	3.0	3.5	3.3	3.4
O_2	0.5	0.5	0.4	0.1	0.2
CO	5.8	5.6	5.9	5.9	5.9
H_2	58.4	55.2	56.5	58.3	57.8
C_nH_{2n+2}	28.3	28.5	29.4	29.9	30.2
N_2	3.2	5.9	3.3	1.4	1.5
"n"	1.08	1.07	1.09	1.04	1.05
Calorific value, B.Th.U. per cu.ft. (at 60°F. and 30 in. satd.)	579	580	604	584	588
Specific gravity (air = 1)	0.362	0.395	0.371	0.354	0.364
Calculated to 1% of nitrogen—					
CO_2	1.0	1.4	1.0	1.1	1.0
C_nH_m	2.9	3.2	3.6	3.3	3.4
O_2	0.2	0.2	0.2	0.2	0.2
CO	5.4	4.0	5.3	5.6	5.7
H_2	60.3	59.5	58.5	58.7	58.3
C_nH_{2n+2}	29.2	30.7	30.4	30.1	30.4

The most effective cracking space in the retort, however, is that over the charge, for the ends of the retorts are subject to cooling by radiation and convection and are at a relatively lower temperature. When, therefore, the charge of coal is reduced in depth the increase in thermal yield is even more marked, up to 3.5 therms. The reason is again the increased production of unsaturated and saturated hydrocarbons, and in this case the mean molecular weight of the saturated hydrocarbons is markedly lowered. This increase in yield is approximately proportional to the increase in cracking space, a conclusion which is supported by the experiments by Colman,(2) who has stated that the main factor affecting the decomposition of the volatile products is the time during which they are exposed to zones of high temperature and that the temperature itself has a less effect; in other words the amount of cracking is increased with an increase in cracking space under conditions where the temperature is constant.

The increased cracking space in the retort has therefore resulted in increased decomposition of hydrocarbons in the vapour phase, producing hydrocarbons of lower molecular weight plus free carbon; this free carbon, as will be shown later, appears in the tar.

Reference has been made by Evans(3) to the importance in carbonization experiments of considering, not only the yield of gas produced, but the yield of "volatile therms," by which is meant the thermal yield of gas plus that of tar. In applying this convention to the present investigation it is preferable to deduct from the thermal value of the tar the free carbon which it contains, as this free carbon is an undesirable constituent in the tar and is not, strictly speaking, volatile.

The yields of the volatile therms from the five experiments calculated per ton of dry ash-free coal and deducting the free carbon in the tar are given in Table VI.

TABLE VI.—YIELDS OF VOLATILE THERMS.

Experiment	1	2	3	4	5
Gaseous therms	78.0	79.2	79.5	79.7	81.5
Tar therms (less free carbon)	19.0	20.2	18.6	19.3	17.3
Total volatile therms	97.0	99.4	98.1	99.0	98.8

The first effect of increasing the cracking space is to increase the yield of both gas and tar therms: a further increase of cracking space, either at the ends or above the charge, but particularly the latter, eventually reduces the tar yield to below that from a full charge, although the total yield of volatile therms is still higher than with a full charge.

The fact that the increased rate of carbonization made possible by using short charges gives an increased yield of gas at the expense of the tar is already accepted in the industry, but exact figures such as are yielded by these experiments are not apparently available. The explanation usually given would appear to be too simple, and the present investigation indicates rather that the increase in the gaseous thermal yield is due to an alteration of the balance of the cracking reactions, and need not necessarily involve a reduction of the tar yield. In these experiments, in fact, the yield of gas does not appear to be obtained at the expense of the liquid products. If coal from the Parkgate seam be carbonized under laboratory conditions so as to give the highest possible yield of tar, and the coke be subsequently heated to drive off all the residual gas, 50.0 therms (28.5 gall.) of tar and 62.0 therms of gas per ton of dry ash-free coal are obtainable. This total of 112.0 therms is greater by 12.6 therms than the highest yield of volatile therms obtained in these experiments. The lower yield is occasioned by too severe cracking, which produces carbon as an end-product.

There seems to be no real reason why this difference should not be reduced by a suitable choice of carbonizing conditions; for example, the introduction of steam might possibly reduce the formation of carbon under conditions which would still permit sufficient cracking of the tar to give a high thermal yield of gas.

It is necessary to consider, however, whether the increase in the normal yield of the gas, produced by increasing the cracking space, is economically justified in view of a possible decrease in the value of the tar.

Tar.

Although it is apparently recognized that the tar produced by short charges is poorer in quality than that from normal charges, this fact is referred to only occasionally in the literature. Meade(4) points out that the primary objections to the short charges formerly used were the extreme degradation of the volatile products and increased retort-house trouble. Kunath(5) has demonstrated by small-scale experiments that the thickening of the tar begins by the separation of solid carbon, and that although this is common to all coals, it is less severe in coals which can be distilled quickly. His remedy for carbon formation is that the retorts should be fully charged. In considering the same question, Evans(3) has stated that it is economically sound to gasify as much of the tar as possible, provided no difficulties are occasioned in the form of stoppages of pipes, &c., and the free carbon in the tar is not increased thereby to more than 15%.

In none of the present experiments did the free carbon in the tar reach the limit of 15%, but nevertheless certain quite marked differences are found if the commercial analyses of the tars, given in Table VII, are examined.

Under standard conditions with full charges, the free carbon in the tar was 4.5%. A 40% increase of the cracking space at the ends gave a tar with a free carbon content of 7.1%, while a similar increase of cracking space over the charge gave a much greater increase to 14.0% of free carbon. The magnitude of other changes in the tar caused by increasing the cracking space over the charge is similarly much greater than when the cracking space at the ends is increased. The relative increase in specific gravity, for example, is from 1.114 with full charges, to 1.128 and 1.170 with an increase of 40% free space at the ends and above the charge respectively, and is accounted for mainly by the formation of free carbon. The considerable decrease in the amount of tar acids with increase in cracking space verifies the fact that these are susceptible to cracking at high tempera-

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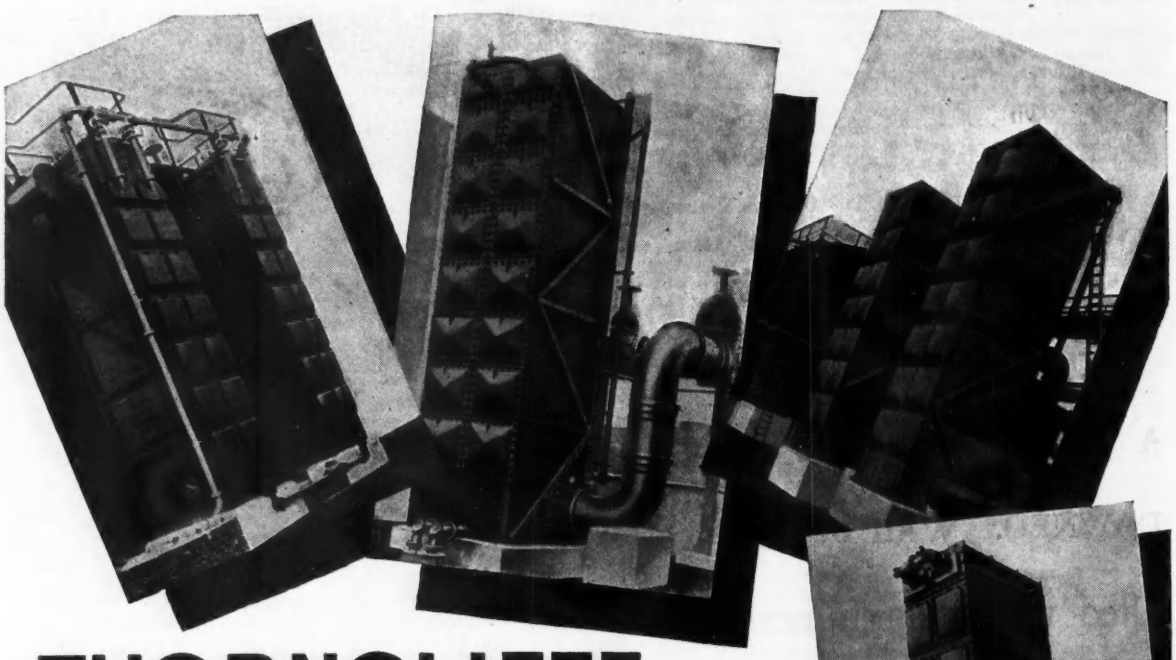

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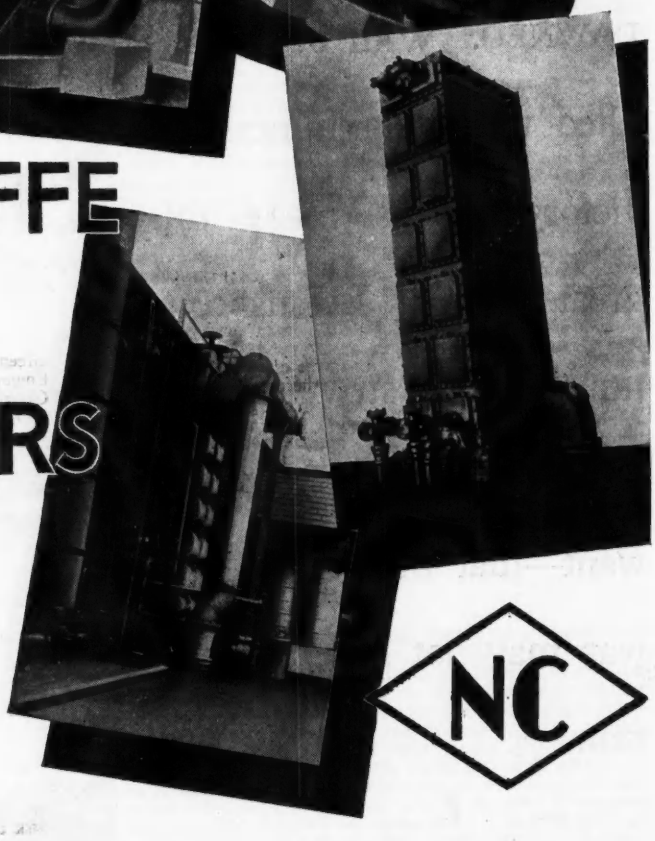

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tures, forming aromatic hydrocarbons. In this case the latter appear as marked increases in the amounts of naphthalene and anthracene.

Certain of the smaller differences shown in Table VII may be said to be more apparent than real, as the standard methods for the commercial analysis of tar are, in certain cases, lacking in exactness, and experimental errors have therefore to be taken into account.

TABLE VII.—COMMERCIAL ANALYSIS OF CRUDE TARS.

Experiment	1	2	3	4	5
Yield per ton of dry coal (gall.)	10.0	10.5	9.8	10.2	9.8
Specific gravity at 15°C.	1.114	1.124	1.128	1.162	1.170
Free carbon (%)	4.5	5.0	7.1	10.1	14.0
Calorific value (dry) B.Th.U. per lb.	16,820	16,800	16,770	16,700	16,600
Constituents (parts per 200 gall. of dry tar):					
Benzole, to 100°C., gall.	1.37	1.98	1.30	1.46	1.98
Specific gravity at 15°C.	0.869	0.873	0.863	0.875	0.875
Toluole, 100°C. to 120°C. (gall.)	2.47	2.72	2.20	3.09	1.95
Specific gravity at 15°C.	0.861	0.869	0.867	0.872	0.870
Solvent naphtha, 120° to 160°C. (gall.)	6.17	6.15	5.92	4.02	3.03
Specific gravity at 15°C.	0.853	0.861	0.863	0.870	0.864
Heavy naphtha, 160° to 190°C. (gall.)	2.71	2.26	2.24	1.67	1.31
Specific gravity at 15°C.	0.864	0.869	0.881	0.890	0.880
Tar acids, anhydrous (gall.)	13.2	11.9	9.7	6.31	5.0
Crude pyridine (gall.)	0.66	0.69	0.64	0.52	0.47
Creosote (gall.)	72.2	69.0	60.6	71.7	66.7
Pitch (cwt.)	10.53	10.75	11.21	11.82	12.80
Crude naphthalene (lb.)	70.1	69.0	85.4	140.9	136.2
Crude anthracene (lb.)	9.4	10.7	13.9	22.5	18.9
Heavy oil					
Heavy oil, including tar acids (gall.)	25.8	26.1	17.5	...	23.6
Specific gravity at 15°C.	1.078	1.084	1.096	...	1.117
Tar acids (%)	11.0	12.0	9.0	...	10.0

Any real difference that may exist in the commercial value of these tars is difficult to assess, particularly as the commercial value is frequently a function of local conditions and markets. For this reason no general conclusion is drawn in this Paper, and the reader is left to assess the alteration in commercial value from the results shown in Table VII.

Coke.

Increase in cracking space, either at the ends or over the charges, had no effect upon the appearance of the coke. Determination of volatile matter suggested that the thinner charges were rather more fully carbonized, but the differences were very small. Determinations of strength by the Shatter Test showed differences only within the limitations of accuracy of the method. The mean result was: On 2 in. 59.5, on 1 in. 87.3, on ½ in. 94.5%.

Effect of Free Space on Scurf Formation

A definite disadvantage of increasing the cracking space has been found in the increased rate of formation of scurf on the retort walls. When the setting was normally operated on the test coal at the rated throughput of 10 tons per day, it was necessary, on an average, to scurf the retorts at intervals of 50 days—*i.e.*, after carbonization of 500 tons of coal. Shortening the charge had a definite effect upon this period; the conditions of Experiment 3, for example, gave a heavy deposit of scurf at the ends of the retort, and it was necessary to burn this off after 19 days. The time required for removal of the scurf was not so long as usual, however, as the ends only had to be cleared.

The conditions of Experiment 5 were even more unsatisfactory from this point of view, and the removal of scurf from the end of the retorts was necessary after a period of 17 days.

These reduced periods of operation are a serious disadvantage of the use of shortened charges.

Summary and Conclusions

A series of experiments was carried out some time before the war at the Fuel Research Station to determine whether increased gaseous thermal yields can be obtained by increasing the free or cracking space in a horizontal gas retort.

Conditions were established for obtaining yields at the rated throughput of the plant (10 tons per day) with full charges of 12 cwt. The charges were then reduced in two dimensions—(1) by shortening the charge, and (2) by decreasing its depth. The cracking space was increased in both series in two steps of 2.4 cu.ft. on an original free space (with full charges) of 11.9 cu.ft. The full increases represent a greater time of contact of the volatile products with the hot retort walls of over 40%.

The increase of cracking space over the charge was found to have a greater effect than the increase at the ends, where the temperatures were considerably lower, the time of contact being the same. The effect of increasing the cracking space by 40% at the ends and over the charge is to increase the thermal yield of gas by 1.5 and 3.5 therms respectively, and to alter appreciably the composition of the tar produced, but not the net yield of tar (total tar less free carbon).

The increased yield of gas is thus not obtained at the expense of the tar, but is due rather to an alteration of the balance of the cracking reactions. This alteration involves the production of greater amounts of gaseous hydrocarbons of lower molecular weight and of carbon which appears as free carbon in the tar.

The effect of increased cracking space upon the components of the tar is mainly as follows, expressed as quantities per 200 gallons of dry tar:

		Full charge.	40% increase of cracking space. At ends.	Above charge.
Free carbon	per cent.	4.5	7.1	14.0
Specific gravity at 15°C.		1.114	1.128	1.170
Tar acids	gall.	13.2	9.7	5.0
Naphthalene	lb.	70.1	85.4	136.2
Anthracene	lb.	9.4	13.9	18.9

Whether these changes discount the value of the increased gaseous thermal yields is a question that can be answered only in relation to local conditions.

The yield of "volatile therms" (thermal value of gas and tar) obtainable from the test coal under laboratory conditions is 112.0, and the fact that the highest yield obtainable in the experiments described above is 99.4 therms suggests the possibility of increasing the thermal yield of gas in horizontal retort practice, by adopting special means to alter the balance of the cracking reactions so as to avoid or reduce the extent of the liberation of carbon.

The work described above was carried out as part of the programme of the Fuel Research Board, and is published by permission of the Department of Scientific and Industrial Research.

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Greenock's Wartime Record

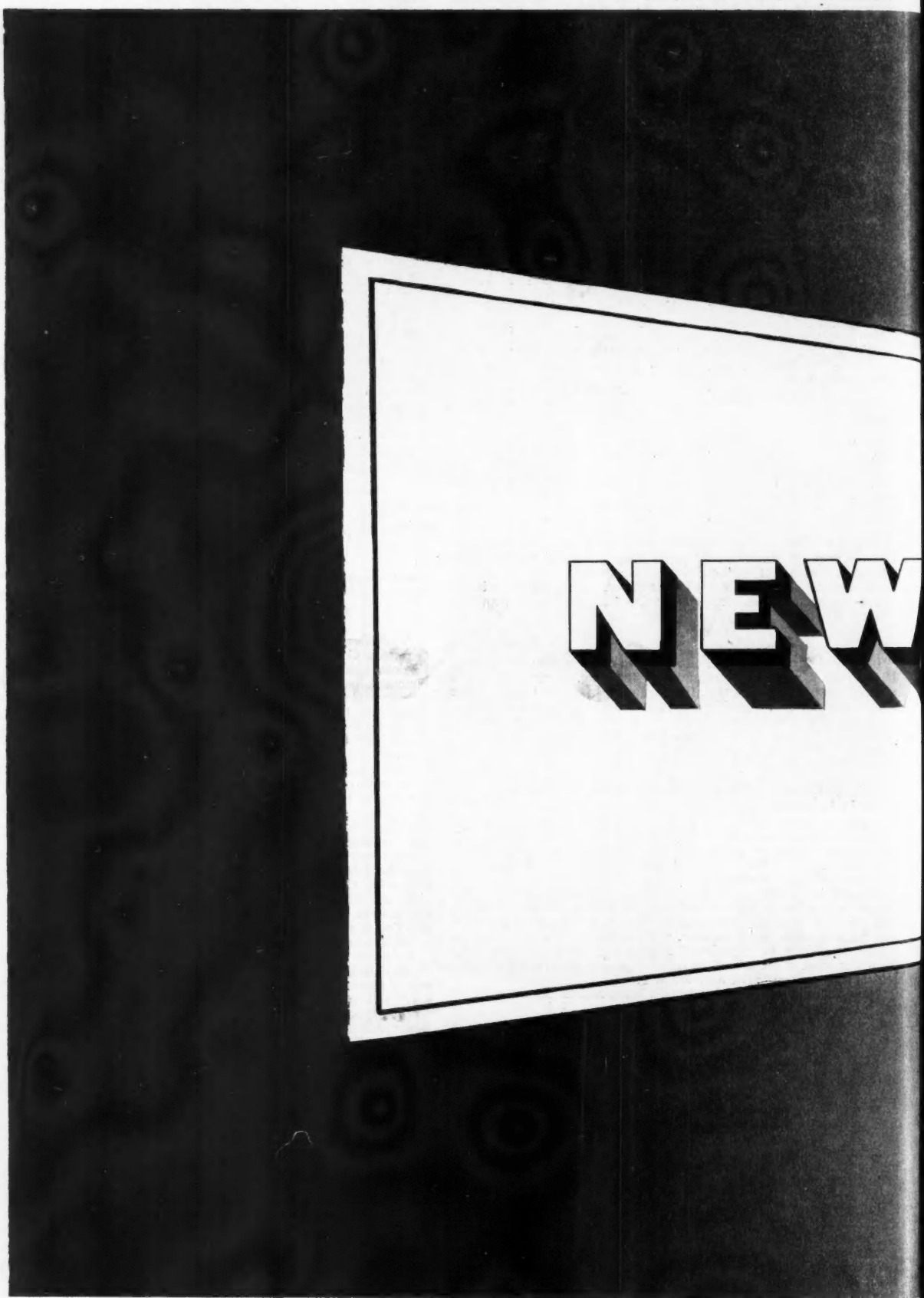
A review of the work carried out during the war years by the Greenock Gas Department has been issued by Mr. R. D. Keillor, Engineer and Manager, who points out that during the war in Europe Greenock had 190 stand-by calls and 34 raid warnings, so that although far removed from the front line they were not forgotten by the raiders. A total of 6,141 war damage repairs were carried out, and considerable assistance was received in the carrying out of repairs and renewals to mains and services from personnel from other Scottish gas undertakings, notably from Glasgow and Edinburgh. Many new gas installations were completed for factories, canteens, and rehousing projects throughout the district.

Early in the war the Corporation sought authority to install a one million cu.ft. per day carburetted water gas plant, complete with fuel handling and overhead storage facilities, but had to be content with installing a plant of half that capacity, without the desired fuel storage and handling facilities. A crude benzole recovery plant, capable of dealing with four million cu.ft. of gas per day, was installed, and some 150,000 gall. of crude benzole has been made available since the plant was put to work in March, 1942. A high tension electrostatic detarrer and a static ammonia washer were installed, and one of the existing 100,000 cu.ft. station meters was replaced by a 200,000 cu.ft. per hour Connersville meter.

To avoid the possibility of flooding which would have followed bomb damage to the steel tank, a one million cu.ft. gasholder was put out of commission for a long period, the opportunity being taken to carry out a thorough overhaul after 25 years' service. Other work carried out included the construction of a reinforced tar and liquor well to store 100,000 gall., gas main linkages with Gourock and Port Glasgow, and the construction of air raid shelters, baffle walls, protection of vital parts of gas-making plant, &c. The Engineer's residence, some distance from the works, was completely destroyed by blast. Total expenditure on A.R.P. installations and war damage repairs was in the neighbourhood of £11,000, and special renewals and replacements of plant involved an expenditure of some £50,000.

Some idea of the expansion of the Department's activities and the effect of increases in the price of coal is given in the following brief summary of increases over the year 1938–39: Average price of coal, 91%; average price of gas sold per thousand cu.ft., 50%; gas manufactured, 25%; total revenue from gas and residuals, 109%; total expenditure, 113%; total wages, 63%.

A Small Committee recently appointed by the American Gas Association to find funds to prosecute research and development work realized, in 90 days only, voluntary subscriptions to the tune of nearly £400,000.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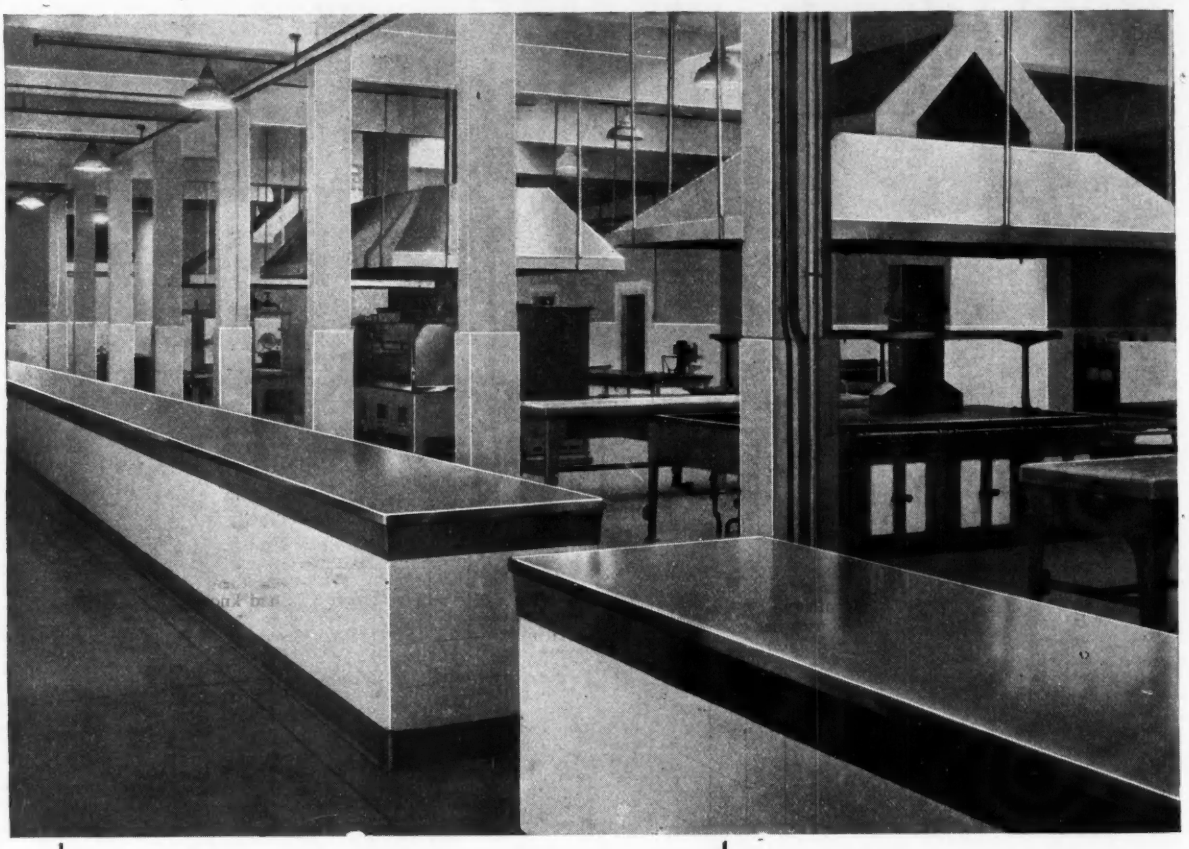

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Reorganization of a Gas Distributing System

The following discussion took place on the Paper by Mr. **F. Bell**, Distributing Engineer, Liverpool Gas Company, to the Manchester and District Junior Gas Association—see "JOURNAL" of Aug. 1.

The **President** (Mr. D. Benson) suggested that the manufacturing side of the Industry was apt to pay too little attention to the problems associated with gas distribution, and his colleagues were much to be congratulated upon the excellent pioneer work they had done.

General Applicability

Mr. **Partington** (Rochdale) said that not all of them were so fortunate as to be engaged with undertakings sufficiently large to embrace schemes of such magnitude, but the ever-growing loads on outer districts were becoming more and more manifest with the building of housing estates on the outskirts of towns, and the problems described in the Paper would apply in some degree to almost every undertaking in the near future. They had all experienced severe weather conditions at the beginning of the year, and doubtless the effect upon the governors enclosed in exposed kiosks had been particularly noticeable. Would Mr. Bell state what the experience had been in Liverpool? Then what had been done to supply the districts through which the high-pressure mains passed? Was the gas collected in a smaller main and, before collecting, did the Author reduce it by a governor, or had he used separate house governors, which would, no doubt, be a job of considerable magnitude? Use had been made of diaphragm governors. Was there any particular reason for these instead of the bell governor which had rendered such good service in the past?

Mr. **Bell** replied that the suggested type of kiosk governor had not been the cause of much trouble during the extremely cold weather, but one governor situated in a kiosk passed a large amount of gas at a maximum of 200,000 cu.ft. per hour. The relay governors caused some trouble and had to be visited each morning during the frost. The diaphragm governors with no relays on them did collect water in the base of the governor, but this did not influence their operation. In regard to local supplies where the intermediate high-pressure gas passed through a district, if the area was a housing estate or sufficiently large to warrant a kiosk governor, one or two mains were connected and supplied from a kiosk governor. In a road of about 50 houses, as happened in one case, the cost of putting in a new main and a governor was far in excess of the cost of installing an individual service governor. As a service governor gave perfect conditions of control to every house, this was satisfactory. With the bell type of governor one had to take care to avoid corrosion, otherwise the maintenance costs would be high. As a matter of fact, they had changed over to weight loading of station governors in Liverpool. Water loading had been discontinued and they were now floating the bell type governor in oil.

Inferences from Flow Instruments

Mr. **Duncan** (Preston) asked whether it was possible from the flow instruments to indicate the maximum peak output, say, every 15 minutes—*i.e.*, the peak per consumer? He found that the maximum output per consumer per hour at Liverpool was somewhere between 12 and 13 cu.ft. per hour. Preston's figure was much the same. Different districts must have different consumptions, such as residential districts as compared with partly industrialized districts. Often they had high consumptions, or the reverse, in working-class districts, villa type districts, and various subdivisions of districts. Would Mr. Bell, from his flow instruments, be able to say whether the output was high in one district as compared with another?

Mr. **Bell** said that the peak output per consumer throughout a whole area was about 13 cu.ft. per hour, and for 240,000 consumers it would be 3.1 million cu.ft. per hour. In a residential district it was found that the consumption at 12.40 p.m., which was a critical period during Sunday lunch-time, was about 25 cu.ft.

The Field Ahead

Mr. **H. B. Taylor** (United Kingdom Gas Corporation) hoped that the Paper would stimulate interest in distribution, particularly in the younger men now concentrating on the manufacturing side. Probably 99% of the undertakings in this country would have to reorganize their distribution systems within the next 10 years. The Paper gave some idea of the importance of the work with which they would all be faced. In the case of his company, out of a total issued capital of about £7,000,000, approximately £750,000 had been expended on distribution improvements since acquisition, and they budgeted for further expenditure of £1,750,000 before all their distribution systems could provide the desired standard of service to meet the loads they confidently expected. If this was typical of what was facing the Industry as a whole, it was important that the money should be wisely spent. To permit this, there must be sufficient technicians available and capable of planning on a scientific basis. He believed that Liverpool was one of the few undertakings recording the rate of flow throughout their distribution system. Surely that was the first essential in the scientific control of distribution. Pressure records were of little use unless co-ordinated with flow records. In re-designing distribution systems, however, it was necessary to know not only the rate of flow about the existing system, but also to make an intelligent estimate of the peak flow conditions to be met in the future. In most districts the potential consumption per domestic consumer was the crux of the whole matter.

It would be of interest if Mr. Bell could give information on the future load conditions for which his system had been re-designed and his methods of estimating these conditions. The method adopted by his own company was to divide the district up into suitable sections, and to estimate in each section the potential domestic, commercial, and industrial loads to be met. They used figures varying from 25 to 45 cu.ft. per consumer, depending upon the type of property in each area, to give the potential average demand per domestic consumer. The potential industrial and commercial peak demands were estimated from a survey of the heat requirements of the establishments in each area. The coincidence of the domestic and industrial peak demands had also to be estimated, having regard to the probable future trend of the gas-using habits of the domestic consumers in the varying types of localities. They had found it possible to build up a reasoned estimate of the supply, and then designed the new system to bring gas in bulk at adequate pressures to each of these points. The distribution of gas from these points throughout each sub-area then became a further problem for study.

The Author had quoted interesting figures regarding initial pressures before and after reconstruction—10 in. now 24 in., 10 in. now 35 in., &c. These increases in pressure would themselves represent a 50% increase in maximum send-out, which indicated that any flow data obtained before the pressures were rectified would be misleading. They must therefore endeavour to picture what the position would be when things were put right, and not as, in most cases, they were now. He could imagine many people saying after reading the Paper, "All we have to do is to put in a booster." In most cases boosting was no satisfactory alternative to new mainlaying. In the case of Liverpool they were fortunate in that they inherited a mains system which was duplicated in many instances, and Mr. Bell had cleverly avoided extensive new mainlaying by isolating some of the trunk mains and converting these to I.H.P., so as to provide in effect a normal low-pressure system supplemented by an I.H.P. feeder system. In most cases this was not possible without laying a new I.H.P. feeder system. If the existing low-pressure system was boosted in order to get better pressures in the outer areas, the consumers there started taking more gas and very quickly the outlying pressures were back where they were, but pressures near the works were excessively high. The undertaking was then left with excessive pressure variations both in the near and outer areas. The condition was then worse than before the installation of the booster, and he had known that occur over and over again.

He agreed entirely with Mr. Bell as to the importance of minimizing the cost of pressure-raising. It was necessary to get the nearer loads distributed at low pressures, and it might be that Mr. Bell, on account of having made use of existing mains for his feeder system, would have to take much of his nearer loads off the I.H.P. mains.

It would be interesting to have information about the pressures at which Mr. Bell's system was now working, or preferably curves showing the pressures throughout the 24 hours at the booster outlets as now working and as estimated when future development accrued. What was the percentage of gas being sent out at booster pressures now, and what would be the estimated percentage following ultimate development? What were the costs of pressure-raising per 1,000 cu.ft. of total sales under present conditions and again under the estimated future conditions? He thought that these figures would demonstrate the flexibility and economy of the re-designed Liverpool distribution system.

The Feeder System

Having brought gas in the feeder mains to the outlying areas at booster pressures, was Mr. Bell proposing to install I.H.P. service mains and services in any of the new housing estates? The speaker's Company had found that with present mainlaying costs they could not afford to put down the normal low-pressure distribution system in these modern low-density estates, even with an average consumption of 200 therms per consumer. Generally they were proposing a feeder system through each estate from which low-pressure service mains serving groups of up to 50 houses were supplied through governors. The feeder system would then work at I.H. pressures at periods of peak demand and at ungoverned holder pressures at periods of low demand. The evolution of an economical method of supplying the modern housing estate was one to which they had given much thought, and one which was of pressing importance to the Industry at the present time.

He had hoped to learn something about the control of the boosters. He appreciated the care which had been taken to minimize the outlet pressure at the boosters with a view to avoiding unnecessary consumption of power. With steam-driven boosters this was comparatively simple, but with electrical drive and positive boosters the problem was more difficult. He drew attention to Mr. Bell's reference to the inspirator as applied to governors. With this device it was possible to maintain a constant outlet pressure during the period while inlet

pressures changed from low to I.H. pressures and *vice-versa*. Further, there was accurate control at very low pressure differences. They were using it extensively and thought that it had a big future. They were employing the diaphragm type for station governors in place of the water-sealed type. He noted that Mr. Bell did not include dust traps before his governors. Was Mr. Bell satisfied that they were unnecessary?

Liverpool had an elaborate system for remote indication and control, but he noted that they were still controlling each governor by its immediate outlet pressure. Their system could easily be adapted so that the point of control was at the centre of gravity of the district supplied by each governor, thereby halving the pressure variation throughout the district. Had Mr. Bell considered this?

He appreciated Mr. Bell's remarks regarding the difficulty of finding sites for governor houses. His Company had the same difficulty in many instances, but it was now their policy to collaborate with the local authority in offering so to construct their houses as to give some public amenity—*e.g.*, a common form was the combined governor house and bus shelter. In one case they had even combined the governor house with a public convenience. In this way they had obtained permission to put down governor houses in the most unlikely places—in the middle of a public park, for instance.

Mr. **Bell** said that booster pressures varied, daytime only, between 6 in. and 20 in., and on Sundays between 6 in. and 35 in. Boosters were both steam and electrically driven. He agreed with Mr. Taylor concerning high-pressure mains through estates and the method had already been developed. Where the intermediate high-pressure main was near they would run right through the estate and take off from it as required. No trouble had been experienced with dust.

With regard to the servicing of governors with a by-pass, they maintained their service by means of a by-pass manipulated by hand-control by the person servicing or, in other cases, they chose times of minimum demand and worked without the by-pass.

Question of Holder Stock

Mr. **H. N. Dann** (Blackburn) asked what was the available stocking capacity and also what was the minimum permissible working stock? Many of the largest undertakings in the country had found, as a result of their war experiences, that it was possible adequately to supply their districts with a much lower holder stock than was previously thought possible. What was the co-ordination between the control room and the production side of the undertaking? He assumed that the stock balancing requirements would necessitate the works being in close contact with the information coming forward to the central control room each day.

Mr. **Bell** said that a maximum stock was within the region of 20,000,000. It would be noted that corrected gas volumes up to 37 millions had been sent out during January, 1945, and 32 millions was normal. By supervision through distribution control, it was possible to reduce gas in certain holders throughout the undertaking to a minimum, and reserve the stock in a minimum number of holders in such a way that during the severe frost period there was a stock of 5.9 millions. Although they were worried, they could still have continued delivering out of the seven delivery stations even with a stock of only 5.9 millions because of the central control. With regard to co-ordination of works make and delivery, the statistician took out a predicted delivery for nine days in advance. This was corrected nearer the date to account for changing weather conditions. The works figures were collected into the centre and the control room was used extensively by the engineer. A written record was maintained of all the information collected, and graphs were plotted showing the hourly make, hourly delivery, cumulo make, cumulo delivery, and total stock. Co-ordination was thus quite extensive.

Incidence of Leakage

Mr. **H. S. Haslam** would like to know that kinds of main had been taken over and whether there had been any leakages? He assumed that if they had been inherited, they had been laid down some 40 or 50 years ago when the pressure was perhaps 4 in. and mains were of cast iron. Could Mr. Bell give some data on pressures away from the governor, with low-pressure or intermediate high-pressure supply? He had stated that some of the subsidiary mains were very small. Would they have to be altered because the primary supply, even from the governor, would not be more than that given by low-pressure supply? Had the delivery of gas increased since the inception of the scheme? Obviously if double pressure was put on, the output of gas would be considerably more and, of course, people would use it. Was there any appreciable difference in delivery of gas?

Mr. **Bell** said that practically the whole of the early Liverpool system consisted of full turned and bored joints, and they had proved perfectly satisfactory. Nowadays half-turned and bored joints were used, which also maintained a rigid joint. The reference to high-pressure holders, &c., was made to cover areas where the intermediate high-pressure main passed badly-designed areas and where local storage may have to be provided. The question on the increase in loads was difficult to answer. Loads were corrected to temperature for the particular month, and in 1945 they were in the region of 9.5% up on the previous years. How much of that percentage could be attributed to war conditions or to the new system they would have to wait until more stable conditions prevailed.

On the motion of Mr. **F. Hodkinson** (United Kingdom), seconded by Mr. **F. Cartledge** (Oldham), a vote of thanks was accorded to Mr. Bell for his paper.

The proceedings concluded by the **President** announcing that the Silver Medal of the Society of British Gas Industries had been awarded to Mr. D. M. Thompson for his Paper on "Gas Lighting—Factors Affecting its Future," which had been read in Liverpool.

"Gas—in Industry at War"

Introducing his Paper bearing the above title at the annual meeting of the Institition of Gas Engineers, Mr. **H. R. Hems,** Chairman of the Industrial Gas Centres Committee, mentioned that he received the greatest co-operation from Government Departments, and particularly from the manufacturers concerned. From makers of furnaces and equipment he received the utmost support, and he paid tribute to the foresight which was shown in 1933, when Sir David Milne-Watson set in train the Industrial Centres Organization on a national basis, putting on sound lines the advisory and testing work which several large gas undertakings were previously carrying out on behalf of their near neighbours. He took it that the British Gas Council would carry on this work.

Unflagging Effort

Mr. **Dean Chandler** (South Metropolitan Gas Company): The Author has given us a clear bird's-eye view of the ground covered and the part played by the Gas Industry in the industrial field during the period of the war. The Industry, I think, has to its credit a really fine achievement in the industrial field, of which it may well be proud.

Now the war in Europe is over, and I would remind you of what was said in 1919 by Lord Moulton, then Minister for the Production of Explosives. He said:

> "The last five years have demonstrated the value of the Gas Industry to the nation in wartime. It lies upon it now to show that it is equally as efficient in times of peace. It will succeed in doing this if it remembers and follows the lessons it has learned in the period of the war."

The circumstances at that time were very similar to those in which we find ourselves to-day. On the same page of the "GAS JOURNAL" on which Lord Moulton's words are recorded, Sir David Milne-Watson stated:

> "The five years that have passed have entirely altered the face of the industrial world, and it is essential that every industry shall be prepared to adapt itself to the new conditions. The Gas Industry is a national one, and it is essential to the welfare of the nation in peace as in war. How is the Gas Industry to fulfil its destiny? By uniting forces in every field, especially the industrial field, and to serve the country to the best of its ability in all its spheres of work."

I make no apology for reminding you of the words of Lord Moulton and Sir David Milne-Watson, for they are just as appropriate to-day as when they were uttered. The story of the work of the Gas Industry at war is of united and unflagging, co-ordinated effort in abnormal and most difficult circumstances; and the difficulties were overcome.

From War to Peace

Mr. **F. L. Atkin** (Birmingham): The Author has confined his remarks chiefly to special war production work. But it should be appreciated that this load has been superimposed on the normal peacetime load, which in itself has been considerably increased due to the gearing up of industrial production. It will be conceded by all, I think, that gas has had a magnificent record of achievement, and one hesitates to think how the war production would have suffered had the supply of gas been denied. The emergency measures mentioned by the Author are an indication of the importance attached to the maintenance of gas supply by the Government Departments concerned. The figures show the terrific increases due to the war effort, and it would be fair to say that the majority of the gas undertakings could not accept additional loads—a most exasperating position for gas salesmen. An unlimited gas supply would certainly have rocketed the figures which are given.

Gas has certainly had the opportunity of showing its paces (incidentally, so has electricity), and will, I feel sure, receive favourable consideration in the future; but that does not mean that there is room for complacency. There is very little economics attached to war production, due to the incidence of factors of which everyone is aware; but as peacetime production is stepped up, economy will once again assert its rightful place. During the last few years furnace design has been fundamentally changed. Comparatively new insulating refractories have been incorporated in furnace construction, and mass production of large quantities of similar

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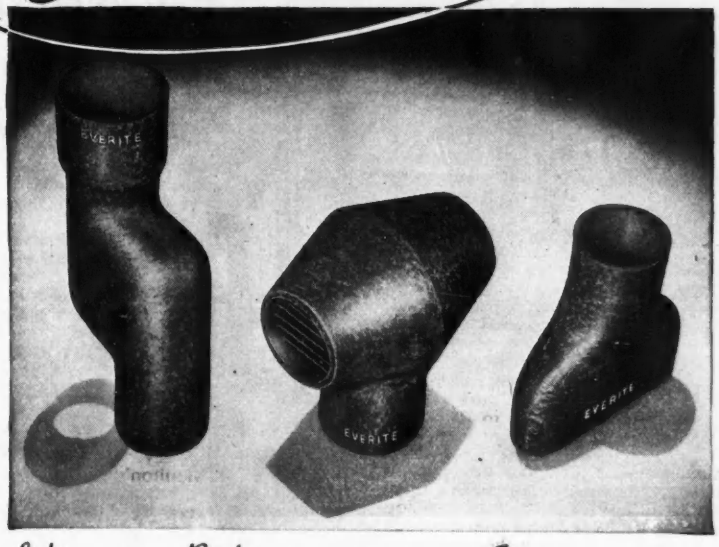

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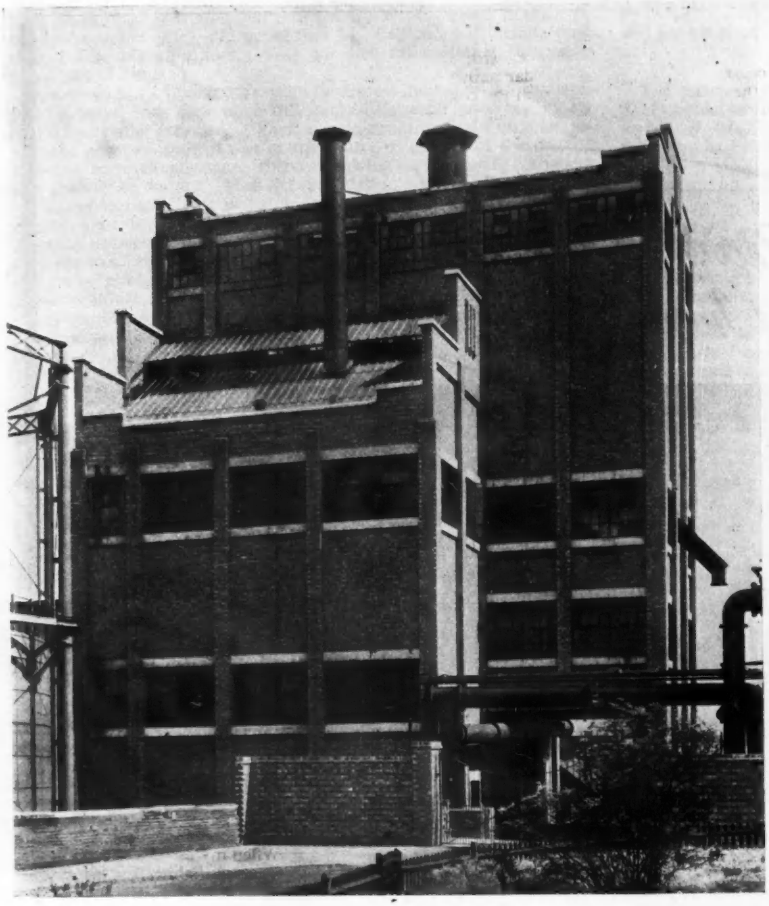

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ARCHITECTURAL FEATURES

From the layman's point of view, perhaps the most interesting feature is the attempt to produce in an essentially industrial building a pleasing architectural appearance. The steel frame-work of the building has been encased in brickwork, and the coal-receiving annexe and coke hoppers are built as integral features of the main building. A liberal use has been made of steel-framed windows for producing maximum natural lighting and ventilation. Parapets with "Snowcrete" coping form a pleasing finish to the skyline. Rain-water pipes are not visible, being taken down internally. The full effect of the building when viewed from Desborough Road is masked to some extent by the abutment of the old horizontal retort house, but when this is dismantled and the new retort house extended it will appear as an independent and symmetrically designed structure.

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articles has encouraged the greater use of conveyors and mechanical loading devices. But, although the majority of the installations have a reasonable efficiency—I do not agree with the Author's statement that the furnaces are of *high* efficiency—they are no better than similar pre-war installations. It should be clearly understood, however, that the responsibility for this cannot be held against the furnace makers or anyone else responsible for furnace design. Furnace construction was hopelessly overtaken by demands in the early stages of the war; consequently it was a question of supplying something to "deliver the goods" quickly, all problems of development being subservient to the extreme urgency of armaments.

In my experience, manufacturers are viewing the labour requirements for heat processes with some misgivings, and are therefore looking favourably on appliances requiring a minimum of labour, with a reduction of the more arduous work. In consequence they are prepared to pay an increased amount for the therms, provided the labour requirement can be reduced—*i.e.*, that they can use mechanized furnaces. Line production has come to stay, and I think the tendency will be away from furnaces as we know them towards furnace-less heat-treatment machines. All this means development, and the question is, "Who is going to do it?"

The manufacture of industrial gas appliances is spread over many comparatively small factories, and therefore, the money available for development is limited. This may be contrasted with other fuel interests—*e.g.*, the electrical appliance makers, who exist in larger groups and whose products command a higher price. This is not the place for making suggestions which are self-evident, but it should be emphasized that the "cheap therm" cannot be substituted for mechanized heat treatment and such-like operations, which are, as individual units, relatively small gas users, but when aggregated under one factory, represent large consumptions.

There are, however, other large-scale uses for gas which must be met by a low-priced therm—*i.e.*, those which are substituted for solid and oil fuel, such as steam-raising, baking, and heat-treatment in the heavy engineering trades.

The sky of industrial gas development is very bright, but there are a few clouds on the horizon—*e.g.*, electric induction heating, both high and low frequency. These clouds may develop into showery weather; therefore, we should use a little intelligent anticipation and provide ourselves with umbrellas in the shape of reasonably priced gas for the larger uses and, more important, the development of "heat-treatment machines" utilizing the modern technique of high-intensity burners, refractory insulation bricks, mechanical handling, photo-electric timing, pneumatic operation, and temperature control.

Trained Personnel Needed

Mr. **E. Crowther** (Newcastle): It is rather significant how manufacturers and industrialists, when they were put on to war production in this war, came running to the Gas Industry in a manner wholly different, I think, from that which occurred during the 1914–18 war. Then they knew nothing whatever about the use of gas for industrial purposes, and at the end of that earlier war they and all of us were just beginning to get some glimmer of appreciation of what there was in this business. But this time industry knew, and industry came to the Gas Industry to an extent which, while gratifying, was alarming, and considerable discrimination was necessary in selecting from our limited availability of gas those industries which could make the best use of it and whose products the country needed most—a decision, of course, which was shortly made at a higher level than our own Industry, to our very great relief. As Mr. Atkin has said, if we had had unlimited supplies of gas it is impossible to say how much we might have sold by the end of the war. It is remarkable that the Industry has been able to cope with new demands, some of them wholly new, on top of the existing loads. This reflects the very greatest credit, not only on the Industry, but on our industrial sales staffs during the inter-war period, in that they so educated industries that they came to gas for their fuel requirements in the manner they did as soon as the need occurred for it. This relatively small body of men, whom Mr. Hems represents by virtue of his Chairmanship of the Industrial Gas Centres Committee, have done a great job of work during the war; but I submit that perhaps their best job of work was done before the war, and it was on account of that work that they were approached, instead of their having to approach the manufacturers, during the munitions period.

Arising from that comes the question of the future. An enormous mass of goodwill has been built up for our product and our service, which will stand us in very good stead. I confess that I had taken the view only a year or two ago that we should see a serious slump in the industrial load. But I am now beginning to doubt it. I think we may see a very slight decline, which will very quickly recover, especially when I reflect on the scheme of the Board of Trade for finding capital for industry. With modernization there will be a load comparable with the wartime load, and we must be ready to meet it.

How are we to be ready? First I suggest that the comparatively small handful of men, represented by Mr. Hems, needs to be very much expanded in numbers. We have not a sufficient proportion of our corporate members who are specialists in the industrial applications of gas. I think we need far more men; and it is quite clear that there are very important careers here for men who are prepared to specialize in this direction.

The second need is to find out what our competitors are doing. I venture to make a suggestion which may or may not have reached the Industrial Gas Centres Committee yet: that it should retain the services of specialists in other fields, so that the Gas Industry, and particularly the Industrial Gas Centres Committee, may be well acquainted with all developments in those other fields before they become dangerous to us. We want to know what is going on before they reach the commercial development stage, so that we may know where we ought to compete and where we ought not to compete, so that we may be in the best possible position to give that service to industry in peace which I think it will not be immodest to say we have given in war.

Value of Co-operation

Mr. **C. F. W. Rendle** (Redditch): It would be a reprehensible lack of perception on our part if we regarded this huge wartime industrial load as purely a matter of wartime opportunism, and one which could not be developed in peacetime. The industrial load is no longer to be regarded as a cheap load which does not pay dividends. There is the advantage arising from the continuity of the load, and in my opinion it would not have been possible to cater for this huge increase during wartime if it were not a 24-hour load. I have been associated with the Regional Gas Engineering Advisory Board for some time; to a great extent the Industrial Gas Centres are similar bodies. I can testify to the immense value of this organization, which, as Mr. Crowther has said, was probably responsible, by reason of the work done before the war, for our ability to cater for the enormous wartime load.

Personal Contacts

Mr. **James Carr** (Stretford): In my own undertaking during the war we have experienced a 100% increase in our industrial load; it has presented many problems and has been very trying on many occasions. Fortunately we have been successful in meeting the enormous increase. There is one note of warning which, from my point of view, I would like to sound. Recently I have made it my personal business to contact most of our large industrial consumers. During the war they have accepted gas for industrial purposes at our prices and on our terms, which mostly were governed by a coal clause. Speaking for my own undertaking, I feel we have now reached the time when we cannot continue to operate the coal clause in its present form. While industrialists are very understanding of our difficulties with regard to the price of coal, they have all hesitated; they think there should be a halt in any future application of the coal clause to industrial gas, and suggest that they will have to look for other forms of fuel unless we attempt to stabilize industrial gas prices for the next two or three years. When my brother introduced the coal clause into industrial gas contracts, probably 15 years ago, in a good many of the undertakings it was not anticipated that it would operate under conditions such as exist to-day. I think we should view the next two or three years with very great caution, and that we shall have to consider ways and means of stabilizing industrial gas prices if we are to retain the business we have gained during the war and look for further increases in the future. I think the possibilities for the future are very rosy. We cannot stress enough the possibilities of personal contacts in all our industrial dealings. My own undertaking is fortunately placed; we have established very good relations, and in 200 odd works I do not think any serious heat-treatment problem was ever considered without making contact through our industrial gas engineer.

Packaged Fuel

The U.S. Bureau of Mines states that thousands of tons of packaged coal, now being burned annually, were formerly wasted. Fourteen States have plants engaged in the businees, some operating as a side line. Manufacture is near the points of consumption to avoid long hauls and rough handling. A plant with a capacity of 150,000 tons of briquettes a year is being built in Philadelphia, Pa., and is to be operated by the Blaw-Knox Company.

It is sponsored by the War Production Board as a measure to relieve the lump-coal shortage and to make use of surplus fines. The material will be pressed into 3 by 3 by 3-in. blocks, consisting mostly of anthracite, a small percentage of bituminous coal, and an asphalt binder. The blocks will be wrapped in paper in groups of six weighing 6½ lb. Placed in a furnace or fireplace, the fuel should not be disturbed until the outer part has coked and is a fused mass. Then it burns like lump coal and should be treated as such.

Newport (Mon.) Gas Company held its annual allotments, gardens, produce and flower competition on Aug. 11. The judges reported that all the exhibits were exceptionally good, and they congratulated the allotment holders and gardeners on their foresight in preparing to meet a possible shortage of produce during the coming winter. Mr. C. O. Lloyd presided, and the prizes were distributed by Mrs. R. J. Auckland.

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Products Prices—Stocks and Shares

The London Market Aug. 20.

The prices of Coal Tar Products are unchanged.

As from March 5, by the Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), the maximum price of Pitch for briquetting has been increased to 60s. per ton f.o.r. supplying works, and the prices for Road Tar, as fixed by the Coal Tar Products Prices Order, 1943, S. R. & O. No. 1528, have been increased by one half-penny per gallon. There is also an increase of 5s. per ton in the price of standard Creosote/Pitch Mixture.

The Government Order of June 11 increased the prices of Coal Tar Spirits. This Order is entitled the Control of Benzole and Coal Spirit Order, 1945 (S. R. & O. 1945, No. 681).

Control of Toluene (No. 4) Order, 1944 (S. R. & O. 1944, No. 170), contains an amendment of the Control of Toluene (No. 3) Order, 1943.

Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O., 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene.

The Provinces Aug. 20.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's. 2s. 4d. to 2s. 6¾d., pure, 3s. 2¼d. (now controlled by S. R. & O. 1945, No. 681), operative from June 11, 1945. Benzole and Coal Spirit, also Coal Tar Naphtha and Xylole, are now controlled by the Control of Benzole and Coal Spirit Order, 1945, dated June 1, 1945, S. R. & O. 1945, No. 681, operative from June 11, 1945. Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943, Naphthalene now controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

Attention is called to Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), referred to on p. 305, "JOURNAL" of March 7.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland Aug. 18.

The reversion from war to peace is interrupting deliveries. Refined tar*: Yield to Distillers is 5d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7¼d. to 7½d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 7d. to 8d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 10d., and 90/190 Heavy naphtha, Unrectified, 2s. 0½d.; Rectified, 2s. 4d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

Far Eastern issues claimed the bulk of attention on the Stock Exchange during the three days of opening last week, a movement which was accentuated on the news that Japan had accepted the terms laid down. Rubber and oil shares were much in demand and prices rose sharply.

Conditions in the Gas Market were much the same as during the previous week with prices inclined to be irregular. There were a few small improvements but several of the leading "ordinaries" weakened again. It will be noticed that a number of issues were marked *ex* the half-yearly dividend.

The following is the full list of charges in price:

SUPPLEMENTARY LIST

Hampton Court Ord. (*x.d.*) ...	100—105	Aug. 13
Mid-Southern Utility "A" Cons. (*x.d.*)	107—112	,,
North Middlesex 5 p.c. Pref. (*x.d.*)	112—117	,,

OFFICIAL LIST

Bombay	42/—45/—	+1/—
Bournemouth max. div. (*x.d.*) ...	155—160	Aug. 13
Cardiff Ord.	120—125	—5
Gas Light Units	20/9—21/9	—/3d.
Ditto 3½ p.c. max.	77—82	+1
Ditto 3 p.c. Deb.	89—92	+1
Imperial Continental	112—117	+2
Mid-Southern Utility "C" Cons. (*x.d.*)	108—113	Aug. 13
Ditto 4 p.c. Pref. (*x.d.*)	100—105	,,
Portsmouth Cons. (*x.d.*)	155—160	,,
South-Eastern Gas Corporation Ord.	20/6—21/6	—1/—
South Metropolitan Ord.	89—92	+1
Southampton Ord. (*x.d.*) ...	107—111	Aug. 13
Swansea 5½ p.c. Red. Pref. (*x.d.*) .	105—110	,,
Tottenham Ord.	113—118	—2
United Kingdom Gas Corporation Ord.	21/—22/—	—1/—
Uxbridge Ord. (*x.d.*)	122—127	Aug. 13
Wandsworth Cons.	113—118	—2
Watford Ord. (*x.d.*)	114—119	Aug. 13

PROVINCIAL EXCHANGES

Bath Cons. (*x.d.*)	113—115	Aug. 7
Chester Ord (*x.d.*)	115—117	,,
Exeter original (*x.d.*)	185—195	,,
Sunderland Ord. (*x.d.*)	122½—124½	,,

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T/A Westwood Wrights, Brierley Hill.

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INSTRUMENTS

Gas Flow Recorders and Indicators
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Mack's Road, Bermondsey, London, S.E. 16. T/N BERmondsey 1151. T/A London Aquol Phone, London.

Paint, Enamel and Insulating Varnish Specialists. "FERRODOR" Metal Protection for protecting Gasholders and other Structural Works from the ravages of Corrosion.

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Horizontal and Vertical Gas Retorts.

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The Department of Fuel Technology covers **Gas Supply, Gas Engineering, Gas Power, Engineering,** and the **Certificates of The Institution of Gas Engineers.**

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EDUCATIONAL (*continued*)

ARTHUR DUCKHAM RESEARCH AWARD

APPLICATIONS before September 8, 1945, are invited for the Arthur Duckham Research Award for 1945-46, namely a FELLOWSHIP of the value of up to £500 for the purpose of an investigation of certain physico-chemical aspects of combustion.

Applicants should not be more than 35 years of age and should possess an Honours Degree of a British University, preference being given to those having experience in the Gas Industry.

Conditions from the Honorary Secretary, Arthur Duckham Memorial Fund Committee, 1, Grosvenor Place, London, S.W. 1.

August 8, 1945.

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Tins for Sale to Consumers. In Bulk for Works Use

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GAS RETORTS in BEST STOURBRIDGE QUALITY also SILICIOUS QUALITY 81% SILICA

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CLOCKWORK Controllers for Public Lighting Control and Time Switches, Clocks and all type of instruments and appliances operated by Clockwork Repaired, Overhauled and Guaranteed. Inquiries welcomed. J. W. & R. E. Hughes (Clockwork Engineers), 58, Victoria Street, London, S.W. 1. ('Phone Victoria 0134.)

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COMPLETE overhaul of Gas Controllers, including cleaning, adjusting, timing, mainsprings, balance staffs, gas cocks, repainting cases, Serial numbers recorded. Large or small quantities. Maintenance contracts undertaken. Estimates free on application to George F. H. Hutchinson, M.B.H.I., Horological Instrument Repairer, "Windy Lea," 36, Lee Lane, Horsforth, near Leeds. 'Phone 2167.

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FOR SALE.—Weir Feed Pump, 8½ in. by 6 in. by 13 in.; Spencer Hopwood Boiler, 10 ft. by 4 ft. 3 in., 90 lb.; Sectional Steel Tank, 16 ft. by 16 ft. by 4 ft.; Steel Tank, 26 ft. by 10 ft. by 8 ft.; Weir Service Pump, 7 in. by 7½ in. by 18 in.; 30 h.p. H.S. Enclosed Steam Engine; 10 h.p. Steam Turbine.

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COUNTY BOROUGH OF STOCKPORT

(GAS DEPARTMENT)

FOR SALE

ONE **MERCURY BULB D.C. RECTIFIER AND** TRANSFORMER, capacity 70 amps. 460 volts from 400 volts, 3 phase A.C., complete with D.C. instruments.

ONE 20 h.p. D.C. MOTOR, 460 volts, 650 r.p.m., by Lancashire Dynamo & Crypto Ltd., complete with controller, resistance and spare armature.

ONE RATEAU 3-STAGE TURBO EXHAUSTER by Bryan Donkin, capacity 200,000 cu.ft. per hour against 36 in. w.g. at 3,900 r.p.m. coupled to Steam Turbine by Greenwood & Batley, developing 40-50 h.p. at 100-120 lb. per square inch, complete with hydraulic regulator, shaft governor, throttle valves and stop valve.

All particulars and facilities for inspection can be obtained from T. Reynolds, M.Inst.Gas E., County Borough of Stockport, Gas-Works, Portwood, Stockport.

Sealed tenders marked "Tenders for Sale of Plant" should be addressed to the Chairman of the Gas Committee Town Hall, Stockport, and be received not later than 9 a.m. on Friday, August 31, 1945.

The Corporation does not bind itself to accept any tender.

ARTHUR BOND,
August 3, 1945. Town Clerk.

FOR SALE.—9,000 cubic feet per hour wet drum type Station Meter fitted with new drum 1935; excellent condition. No valves or connexions. Available in 4-5 months. May be inspected and offers sent to J. C. Cotterill, Engineer and Manager, Gas-Works, West Bridge, St. Austell.

URGENTLY required.—Gas-fired Multitubular BOILER. Evaporation 800/1,200 lb. per hour. Working pressure 100 lb. Good condition essential. No. 9460, "GAS JOURNAL," 51, High Street, Esher, Surrey.

WANTED.—Small Cast Iron AMMONIA STILL, sectional type, 3 ft. to 4 ft. diameter. Address No. 9462, "GAS JOURNAL," 51, High Street, Esher, Surrey.

CONTRACT OPEN

COUNTY BOROUGH OF BLACKPOOL

(GAS DEPARTMENT)

TENDERS are invited for the Supply, Delivery, and Erection of a TURBINE-DRIVEN THREE STAGE BOOSTER to be erected at the Marton Gas-Works, Blackpool.

The Booster to be capable of dealing with one million cubic feet of gas per hour, with a minimum Inlet Pressure of 6 in. w.g. and a maximum outlet pressure of 60 in w.g. The Turbine to be designed to supply exhaust steam at pressures for process work, and in addition a Condenser shall be provided by the Contractor to deal with Exhaust steam when process steam is not required.

Further particulars may be obtained from the Gas Engineer and General Manager, Princess Street, Blackpool.

Tenders to be enclosed in an envelope and endorsed "Turbine-Driven 3-Stage Booster" and not bearing any name or mark indicating the sender must be delivered to me at the Town Hall, Blackpool, not later than 10 a.m. on Monday, September 17, 1945.

Town Hall, Blackpool. TREVOR T. JONES, Town Clerk.
August 17, 1945.

APPOINTMENTS VACANT

None of the situations advertised in these columns relates to a man between the ages of 18 and 50 inclusive or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1945, or the vacancy is for employment excepted from the provisions of that Order.

SENIOR DRAUGHTSMAN required, experienced in design of Carbonizing Plant and Structural Work, also capable of taking out quantities and preparing specifications.

Reply, stating Age, Experience and Salary required, to F. C. Sugden & Co., Ltd., 10, East Parade, Leeds, 1.

(*Classified Advertisements continued on p. 274*)

APPOINTMENTS VACANT
(continued)

Revised Advertisement.

HALESOWEN GAS COMPANY

APPLICATIONS are invited for the Position of TECHNICAL ASSISTANT. Candidates should have practical experience in the operation of Gas-Works Plant, particularly with respect to Horizontal Retorts, Benzole extraction and C.W.G., and in Gas-Works Chemistry.

Commencing Salary £300 per year, plus cost of living bonus. Living quarters can be made available if required.

Applications, with full details of qualifications and *copies* of Testimonials, are desired by September 10, 1945.

Gas-Works, Halesowen, Worcestershire.
J. H. WAINWRIGHT, Engineer, Manager and Secretary.

REQUIRED.—MAINTENANCE FITTER with Gas-Works experience, preferably with horizontal plants on small works. Single man preferred, able to drive. Apply: Severn Valley Gas Corporation, Gas-Works, Cheltenham.

PORTSMOUTH AND GOSPORT GAS COMPANY
GENERAL MANAGER

THE Directors of the Portsmouth and Gosport Gas Company invite applications for the position of GENERAL MANAGER (vacant through the death of Mr. Thomas Carmichael).

Testimonials are not required in the first instance, but applicants should state their Age, Qualifications, Experience, present position and salary expected.

Letters, marked "Private," to be sent, by September 8, 1945, to the Chairman, Portsmouth and Gosport Gas Company, Chief Offices, The Square, Portsmouth.

SKIPTON URBAN DISTRICT COUNCIL
APPOINTMENT OF GAS ENGINEER AND MANAGER

APPLICATIONS are invited for the above appoint-ment at a salary of £500 per annum, rising by annual increments of £25 to £600 per annum, plus cost-of-living bonus.

The tenancy of a house owned by the Council will be offered to the successful candidate.

The carbonizing plant consists of modern machine-charged horizontal retorts, and applicants should have a thorough working and theoretical knowledge of plant of this character, together with adequate commercial and distribution experience.

The appointment will be subject to three months' notice on either side, and to the provisions of the Local Government Superannuation Act, 1937. The person appointed will be required to pass a medical examination.

All fees, emoluments and payments received from or by virtue of this appointment, or any other offices to which he may be appointed by or with the consent of the Council, shall be paid by him into the Council's account.

Applications, stating Age, Qualifications and full record of Experience, and giving the names, status and addresses of three referees, must reach this office not later than first post on Thursday, August 30.

No application form will be issued.

Canvassing, directly or indirectly, will disqualify.

Town Hall, Skipton, Yorks.
K. B. ROBINSON, Acting Clerk of the Council.

August 10, 1945.

STROUD GAS LIGHT AND COKE COMPANY

APPLICATIONS are invited for the position of GENERAL WORKS FOREMAN at a wage of £7 per week inclusive of War Bonus.

Carbonizing Plant consists of Horizontal Machine Charged Retorts.

Profit sharing and Superannuation Scheme in operation. Successful applicant will be required to pass a medical examination.

Applications to be received by the undersigned on or before September 3, 1945.

F. B. WALLER, Engineer and Manager.

BOROUGH OF NEWARK-ON-TRENT
APPOINTMENT OF GAS ENGINEER AND MANAGER

APPLICATIONS are invited for the above appoint-ment at a commencing Salary of £650 per annum, rising by annual increments of £25 to a maximum of £800 plus cost of living bonus, at present £59 16s. per annum.

Candidates must be Corporate Members of The Institution of Gas Engineers and must have had practical experience in the control of a Gas Undertaking. Experience in the recovery of by-products, Gas distribution, and the development of gas sales on modern lines is essential. House available.

Candidates must not be over 45 years of age.

The appointment, which will be subject to the provisions of the Local Government Superannuation Act, 1937, and the passing of a medical examination, will be determinable by three months' notice on either side.

Applications, stating Age, Qualifications and Experience, and as to the position under the National Service Acts and the Registration of Employments Order, accompanied by *copies* of three recent testimonials, and endorsed "Gas Engineer and Manager," must reach the undersigned not later than September 7, 1945.

Canvassing members of the Council is prohibited and will disqualify.

Town Clerk's Office, Newark-on-Trent.
H. TALLENTS, Town Clerk.

August 8, 1945.

BOROUGH OF ILKESTON

APPLICATIONS are invited for the permanent Position of TECHNICAL ASSISTANT to the above Undertaking at a commencing salary of £250, rising in increments of £15 to £320 per annum, in accordance with Grade "E" of the Council's Grading Scheme, plus cost of living bonus.

Candidates should have experience in the operation of Gas-Works plant, particularly W.-D. Vertical Retorts, and should also have experience in Practical Gas-Works Chemistry.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, marked "Technical Assistant," stating position under National Service Acts and Essential Works (General Provisions) Order, and giving full particulars of Age, Training, Experience, and Qualifications, with *copies* of three recent Testimonials, to be received by the undersigned not later than Tuesday, August 28, 1945.

Canvassing, directly or indirectly, will disqualify.

Town Hall, Ilkeston.
E. I. E. WILLIAMS, Town Clerk.

August 13, 1945.

COUNTY BOROUGH OF MIDDLESBROUGH
(CORPORATION GAS DEPARTMENT)
APPOINTMENT OF CHIEF CHEMIST AND TECHNICAL ASSISTANT

APPLICATIONS are invited for the appointment of CHIEF CHEMIST AND TECHNICAL ASSISTANT.

The Salary will be £440 per annum, plus cost-of-living bonus, which is at present £59 16s. per annum, rising by annual increments of £20 to £500 per annum.

Applicants must have sound experience of the chemical control of a large Undertaking, and have practical experience of modern gas manufacture and Water Gas Plant.

The appointment will be subject to the Corporation's regulations governing conditions of service, and to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, giving full details of Age, Training, Qualifications, and Experience, stating position under the Essential Works Order and in regard to military service, together with three recent Testimonials, must be delivered to the undersigned not later than Monday, August 27, 1945.

Corporation Gas-Works, Commercial Street, Middlesbrough.
JOHN W. PALLISTER, M.Inst.C.E., M.Inst.Gas E., A.M.I.Struct.E.

PONTYPOOL GAS AND WATER COMPANY

APPLICATIONS are invited for the appointment of ASSISTANT ENGINEER to General Manager of the above Undertakings, the present output being:

650 million cu.ft. of gas per annum.
400 million gallons of water per annum.

Conditions of appointment and salary may be obtained from the undersigned.

General Offices, Clarence Street, Pontypool, Mon.
J. POWDRILL, General Manager.

URGENTLY REQUIRED.— ENGINEERING DRAUGHTSMEN, mechanical and structural. FITTERS, PLATERS, PLATERS' HELPERS, and STEELWORK ERECTORS. Apply to Messrs. W. J. Jenkins & Co., Ltd., Beehive Works, Retford, Notts.

APPLICATIONS invited for the post of DISTRI-BUTION SUPERINTENDENT. Remuneration £400 per annum, including bonus. Duties will include supervision of Showroom and District Sales.

Cleethorpes Gas Company, 421, Grimsby Road, Cleethorpes.

MIDLAND METER MANUFACTURERS require capable MANAGER to take charge of their London Repairing Depot. Must be fully experienced in the trade, and a practical knowledge of meter construction an advantage. Permanent position with good prospects for suitable applicant.

Reply in confidence, stating Age, Experience, Salary required to No. 9461, "GAS JOURNAL," 51, High Street, Esher, Surrey.

APPLICATIONS are invited for Positions on the TECHNICAL STAFF of a large gas undertaking in the Greater London area. Qualified and experienced chemists, not less than 25 years of age, with knowledge of the control of gas manufacturing and purification plant. Salaries will be in accordance with the qualifications in each case, but will be not less than £400 per annum. Applicants should state their Training, Experience and Qualifications. Applications must be received not later than Saturday, September 8, 1945. Address No. 9464, "GAS JOURNAL," 51, High Street, Esher, Surrey.

HINCKLEY URBAN DISTRICT COUNCIL
(GAS DEPARTMENT)
TECHNICAL ASSISTANT AND CHEMIST

APPLICATIONS are invited for the above Position at a commencing Salary of £300 per annum plus War Bonus of £59 16s. Experience with modern Woodall-Duckham Retorts, Benzole Recovery and C.W. Gas desirable. Applications, stating Age, Education, Training, Qualifications and Experience should be addressed to the undersigned not later than August 30.

Gas-Works, Hinckley, Leicestershire.
A. B. BRITTON, Engineer and Manager.

DRAUGHTSMEN.—London Firm of Carbonizing Engineers require mechanical and structural DRAUGHTSMEN with experience of Continuous Vertical Retorts and Intermittent Chambers. Must be capable of working with minimum supervision. Five-day week. Applications, which will be treated in strict confidence, giving full particulars of experience, with salary required, to be addressed to No. 9459, "GAS JOURNAL," 51, High Street, Esher, Surrey.

THE EAST ANGLESEY GAS COMPANY

THE above Company require a WORKING MANAGER for the Amlwch Gas-Works, annual make 12 million cu.ft. Applicants must be practical and experienced men able to do anything on a small works and district, and able to control workmen.

Applications, giving details of Age, Experience at other works, position under the Essential Works Order, and stating wages required (house, coal and gas will be provided free), should be forwarded to E. Wilkinson, Chief Engineer, c/o Gas Offices, Amlwch, Anglesey.

BRIXHAM GAS AND ELECTRICITY COMPANY

APPLICATIONS are invited for the Position of GAS-WORKS SUPERINTENDENT. Applicants should possess a sound mechanical training and the ability to carry out routine chemical and physical testing. Experience with Woodall-Duckham Vertical Retorts, Carburetted Water Gas and Activated Carbon Benzole Recovery Plants an advantage.

Possession of The Institution of Gas Engineers' Higher Grade Gas Engineering (Manufacture) Certificates preferable, but not essential.

Salary £300 per annum, plus war bonus, plus gas, electricity, and coke at half price.

Applications, giving details of Age, Training, and Experience, and stating position under the Essential Works Order, together with *copies* of two recent Testimonials, to be sent to the Engineer and General Manager, Brixham Gas and Electricity Company, Brixham, Devon.

BRIGHTON, HOVE AND WORTHING GAS COMPANY
APPOINTMENT OF ASSISTANT GAS ENGINEER

APPLICATIONS are invited from suitably qualified persons for the Position of ASSISTANT GAS ENGINEER at the Works of the Company at Portslade, Sussex, at a commencing Salary of £600 per annum, plus cost of living bonus, at present £50 per annum.

Schemes of Co-partnership and Contributory Pensions are in operation in the Company's undertaking, to membership of which the successful applicant will be eligible upon completion of one year's approved service.

Candidates must have a thorough knowledge of, and experience in the control of Gas-Works plant and processes, including Horizontal Retort Carbonization and Carburetted Water Gas production and Benzole recovery, and be accustomed to the supervision and charge of labour.

Applications, stating Age, Experience, and Qualifications, accompanied by *copies* of two recent Testimonials, must reach the undersigned not later than September 10, 1945.

The Ministry of Labour and National Service has given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

77, West Street, Brighton, 1.
P. E. BROWNE, Managing Director.

THE COATBRIDGE GAS COMPANY (INCORPORATED)
DISTRIBUTION ENGINEER

APPLICATIONS are invited for the above Position. Candidates (preferably about 35 years of age) should be experienced in the control of gasfitters, in main and service work, high and low pressure distribution, and the application of gas for domestic purposes.

Experience in the use of gas for industrial work is desirable.

The person appointed must devote the whole of his time to the duties of the office and reside in Coatbridge.

The appointment is subject to membership of the Company's Contributory Pension Scheme.

Applications marked Distribution Engineer, giving Age and full particulars of experience and salary required with *copies* of three recent Testimonials, and stating position under the Essential Works Order, to be received by the undersigned not later than Friday, August 31.

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy A 9(*c*).

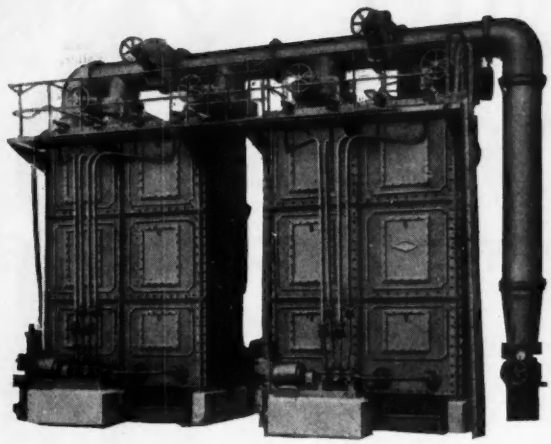
Gas-Works, Coatbridge.
(Sgd.) GEO. BRAIDWOOD, Engineer and Manager.

August 14, 1945.

OVERSEAS EMPLOYMENT.—GAS-WORKS FOREMAN required by the City Council of Gibraltar. Salary £290 rising to £380 a year, plus war bonus of £51. No local income tax. Free passages and quarters. The post is pensionable, the first year's service being on probation. Candidates should have had practical experience in carbonizing and control of inclined settings and in the operation and maintenance of H. & G. carburetted water gas plant. They should also have a thorough knowledge of ancillary plant, works routine and control, and should be capable of taking charge of the Works in the absence of the Gas Engineer.

Written applications (no interviews) giving the following essential details: (1) Full name, (2) Date of birth, (3) Industrial training and experience, (4) Name and address of present employers, (5) Details of present work, should be sent to The Secretary, Overseas Manpower Committee (Ref. 1751), Ministry of Labour and National Service, York House, Kingsway, London, W.C. 2. Applications cannot be acknowledged.

26.7.A.2.



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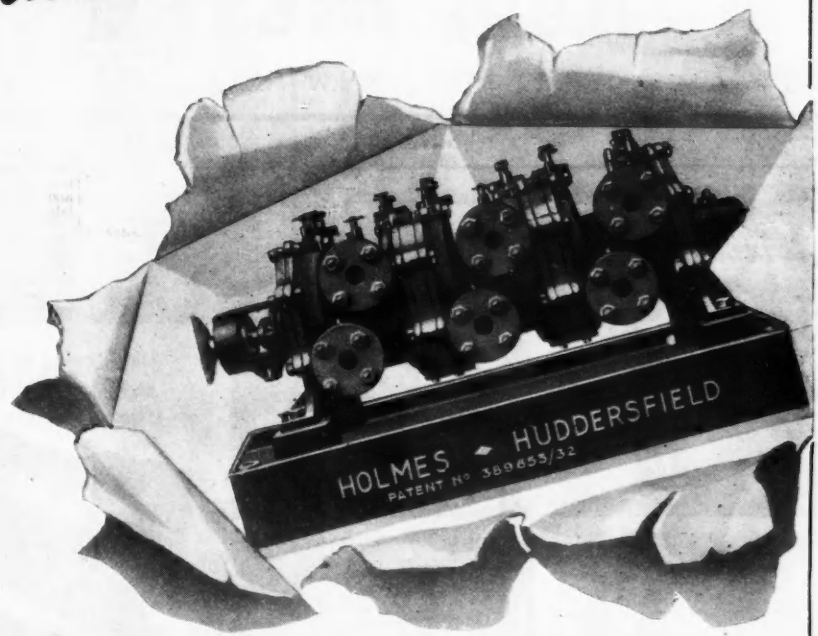
WITH The Patent 'Monobloc' Pump

PATENT NO: 389653/32



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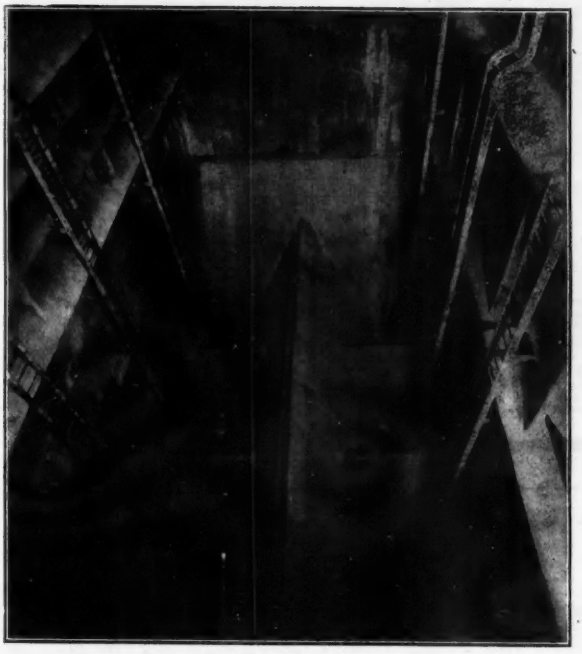

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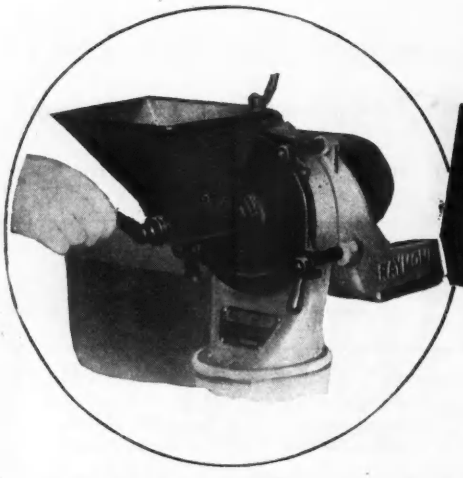

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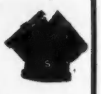

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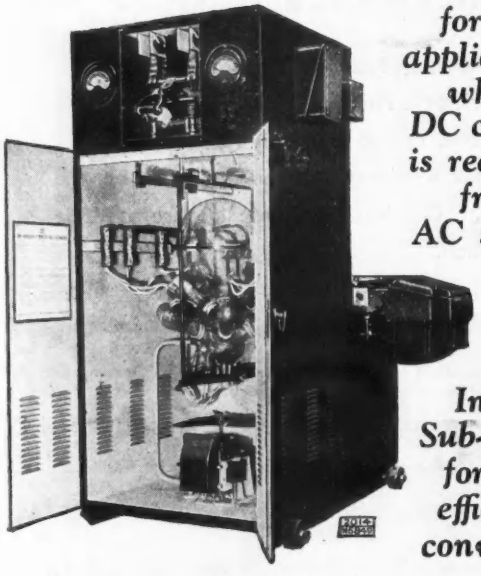

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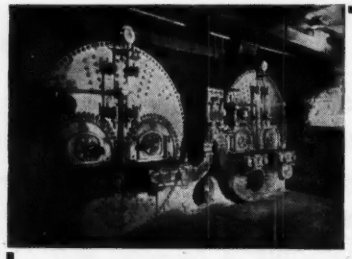

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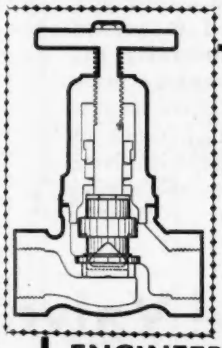

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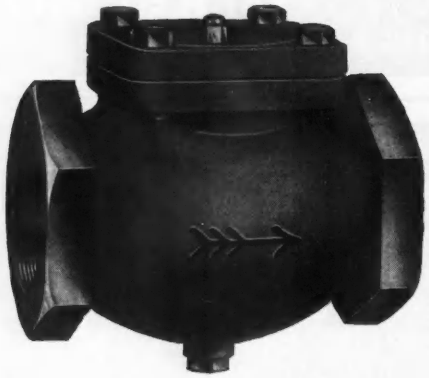

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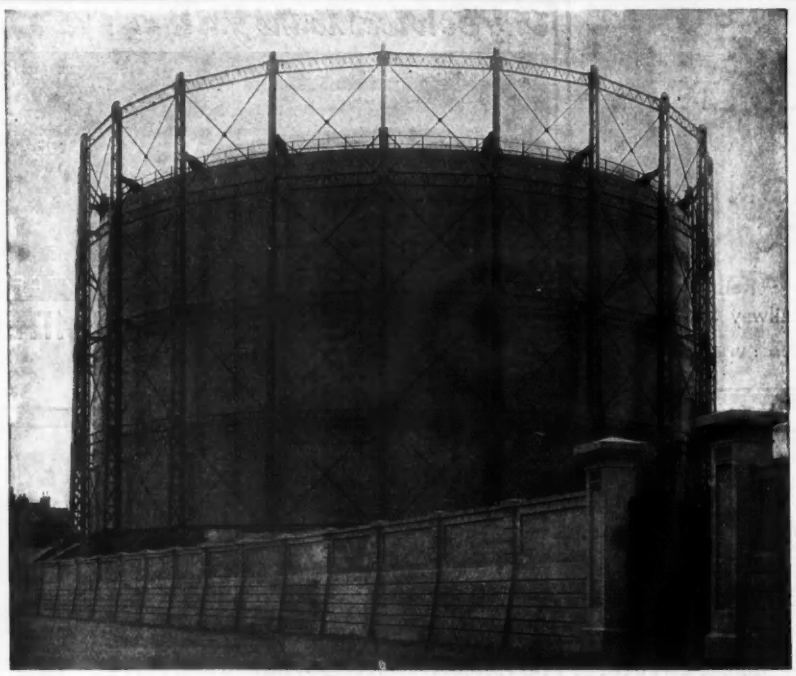

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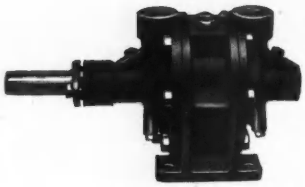

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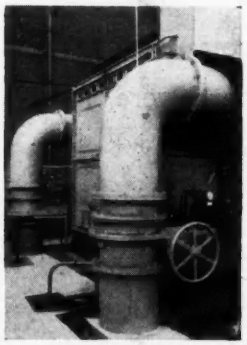

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